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SUMMARY OF RECENT ABSTRACTS*

IX. LEPROSY

General

A bibliography of leprosy from the year 1500 has been published by KEFFER (p. 1133). A history of leprosy in Brazil has been written by DE SOUZA-ARAUJO (p. 1132). This completes a great task, the first volume of which was published some time ago.

A special issue of *Leprosy in India* (p. 790) is devoted to the conference held at Wardha. This should be read in full.

DHARMENDRA (p. 791) declares that leprosy legislation in most of India is out of date. He outlines some of the points which should be included in future acts. In the same discussion COCHRANE (p. 791) makes the point that any legislation which encourages an atmosphere of dread, and drives patients into hiding, is bad. It is not practicable to isolate all infective patients, and investigation is required to discover the minimum amount of segregation needed to control the disease.

Epidemiology

The distribution of leprosy throughout the world is dealt with in a supplement to the *International Journal of Leprosy* (p. 436).

The number of cases of leprosy in Norway has diminished from 3,000 in 1856 to 23 in 1943 (HARBITZ, p. 607).

Leprosy is prevalent in the Belgian Congo and although the general incidence is probably no more than 5·5 per 1,000 of the population, DUBOIS (p. 436) quotes documents to show that in some villages up to 100 per 1,000 are affected. The commonest exposure is domestic. For control, agricultural colonies have been instituted, largely under the care of medical missionaries; most of the patients in them have lesions of the nerves. [This is a long communication which should be studied in the original.]

CHAUSSINAND (p. 607) has analysed 1,002 cases of leprosy in Cochin China, in relation to age and sex. Three-quarters of the patients were males. There were many more male than female patients in the age group 15–20, which probably reflects the greater opportunities for infection experienced by males outside their families. Up to the age of 15 rather more female than male children were infected, and the female rate rose at ages 25–29 and 40–44, probably reflecting the stresses of child-bearing and the menopause.

*The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin*, 1948, v. 45. References are given under the names of the authors quoted and the pages on which the abstracts are printed.

DOULL *et al.* (p. 525) have carried out a detailed enquiry into the histories of 3,204 families in the Philippine Islands, in relation to leprosy. The births date back to 1896. They found that infection rates in those born in 1911–25 were only one half of the rates in those born in 1896–1910, and that in families in which lepromatous leprosy had occurred the fall in incidence had been even greater than this. Compulsory segregation was introduced in 1907, and this may have been a factor, but other changes also took place, particularly a rise in the standard of living.

AYCOCK and GORDON (p. 186) discuss leprosy in veterans of the American forces. Most of those known to have the disease were born in the endemic areas of the United States, and many had not served in endemic areas overseas. Leprosy is still endemic in Texas, but many of the patients diagnosed there were born in Mexico (JOHANSEN, p. 610). MCCOY (p. 1007) discusses the few cases of leprosy in California, very few of whom were infected in that State.

FLOCH (p. 437) reports on leprosy in French Guiana, where 5·1 per cent. of the population are infected. One half of the new cases discovered are in children under 15 years, and there is a real danger of spread from infected schoolchildren to their schoolmates. Familial infection is evident, and a case is quoted where a servant infected five infants. Europeans are usually only infected after long residence, but they do not show the same degree of resistance to the disease as is characteristic of the local people.

RISI (p. 438) states that in the humid Amazon valley of Brazil the incidence of leprosy is high—1·0 to 3·8 per 1,000—but in the dry north-east it is 0·9 or less. Proportionately, there are more severe lepromatous cases in the north-east than in the more humid areas. BRAGA (pp. 1007, 1090) found leprosy in 0·35 per cent. of 66,764 industrial workers in Rio de Janeiro.

Transmission

CHAUSSINAND (p. 1008) reviews the history of contact in 1,223 patients in Indo-China; the indication is that the disease may be contracted through contact of comparatively short duration. AYCOCK (p. 712) discusses conjugal leprosy, and the rôles of contagion and hereditary susceptibility; the original should be consulted.

PORRITT and OLSEN (p. 441) report two cases in which leprosy was apparently acquired during the process of tattooing.

MOISER (p. 91) refers once more to his theory that leprosy is transmitted by the bites of cockroaches, and gives details of their anatomy and ecology.

Aetiology

CHAUSSINAND (p. 187) recognizes four morphological forms of *Myco. leprae*: the normal forms; large forms undergoing evolution (not found in lepromata); those undergoing transverse division (in globi and in stages of rapid multiplication); degenerating forms in patients undergoing successful treatment.

The same author (p. 187) sums up the attempts which have been made to cultivate *Myco. leprae*; there may have been some sign of growth in some attempts, but subculture has proved difficult or impossible, and most of the workers who have tried to cultivate the organisms have failed, or have been misled by apparent increase in growth of the inoculum. On injection, true *Myco. leprae* killed by heat give negative local reactions in lepromatous leprosy and positive in tuberculoid leprosy; similar injections of other acid-fast organisms give positive reactions in tuberculin-positive persons. *Myco. leprae* are phagocyted slowly after injection into the body cavity of the wax moth, but other acid-fast organisms are rapidly disintegrated. These tests are useful for recognition of *Myco. leprae*. He (p. 188) sums up his extensive work on inoculation of leprosy material into animals. This has been very disappointing,

since general infections, of a kind which afford opportunities for testing the value of drugs, could not be induced.

DE SOUZA-ARAUJO and ROSSELL (p. 344) have isolated acid-fast bacilli from drainage effluents of a leprosarium in Brazil ; on cultivation these organisms resembled those previously cultivated by the authors from leprous material.

A modification of the carbol-fuchsin method of staining *Myco. leprae*, in the cold, is described by ZANETTI (p. 91), who claims better results than by the hot method.

In a paper written some years ago STEINIGER (p. 1008) summarized the arguments for the now discredited theory that there is some connexion between leprosy and the sapotoxins of *Colocasia*. CHAUSSINAND (p. 1012) has enquired into this question of *Colocasia* in Cochin-China ; like most other workers he concludes that it has no significance.

Classification

In discussing the modern classification of leprosy into lepromatous, tuberculoid and uncharacteristic forms, IGNACIO CHALA (p. 345) makes the point that the last is a transition stage, and that most patients ultimately become either lepromatous (with negative lepromin test) or tuberculoid (with strongly positive lepromin test). PORTUGAL (p. 439) has examined a group of patients in relation to the South American classification. He agrees that the uncharacteristic cases may evolve into either tuberculoid or lepromatous disease, but they may remain non-characteristic. RODRIGUEZ (p. 439) proposes the addition of a fourth type to the three recognized by the Pan-American Conference of 1947 (uncharacteristic, lepromatous, tuberculoid), to which he assigns those types showing only interstitial proliferation. He adds various subdivisions of these four main types. DE SOUZA LIMA *et al.* (p. 440) discuss the South American classification in relation to the pathology of the various types and stages. It is based on clinical, immunological and histological features.

DUBOIS (p. 438) is critical of the classifications proposed recently by South American workers, and suggests one of his own, based on the bacillary content of the tissues, but allowing for clear distinction of lepromatous, tuberculoid and neural cases. It is somewhat complicated.

Tests

DHARMENDRA (p. 612) has contributed a detailed review of the literature on the lepromin test.

NOLASCO (p. 613) has shown that lepromin keeps its properties for very long periods even when it is not stored in a refrigerator.

AZULAY (p. 440) thinks that the mechanism of the lepromin reaction is based on the constitutional reactivity of the tissues, and that this may be accelerated by *Myco. leprae* or *Myco. tuberculosis*. In children of leprosy patients, SAYAGO (p. 91) found no increase in the tuberculin-positive rate over the rate in controls ; but there was a high rate for the lepromin test. CONTRERAS and JAQUETI (p. 1008) have carried out the lepromin test on persons free from leprosy, and found it positive in 44 per cent., especially in those with tuberculous skin lesions, varicose ulcers, and other skin conditions. They therefore regard it as useless for diagnosis.

IGNACIO and TIONG (p. 612) confirm previous work which showed that there is a tendency of young leprous children to react more strongly to lepromin with increasing age and with repeated tests. There seemed to be a direct relationship between repeated testing and clinical improvement, which may indicate some immunizing value. The lepromin test is of prognostic value ; children showing consistently weak reactions have poor prognosis. CHAUSSINAND (p. 1009) confirms the value of the intradermal lepromin test in prognosis. In healthy

children, however, he found remarkable parallelism between the tuberculin and the lepromin tests, and noted that children negative to both could be made positive to lepromin by vaccination with BCG. He thinks that anti-leprosy immunity, therefore, may result from infection with either the tubercle bacillus or the leprosy bacillus—or with BCG.

A study by DE SOUZA LIMA and DE SOUZA CAMPOS (p. 712) of 901 patients who were tested with lepromin in 1941, and of the progress of the disease in them, showed that although the test has considerable value in prognosis (especially in tuberculoid leprosy), this is by no means absolute.

Recognizing the value of the lepromin test in prognosis, and the fact that a delayed positive test may be given by persons who have not been in contact with leprosy patients, BECHELLI (p. 1010) suggests that all persons who attend on leprosy patients should be tested. Positive reactors should continue at work, but should be re-tested at intervals, and if the test becomes negative, their work should be changed. It is, however, rare for healthy attendants to contract the disease.

FERNANDEZ and MERCAU (p. 611) find that when desiccated *Myco. leprae* (from leprous tissue) are suspended in oil, and injected intradermally as in the lepromin test, the reaction in 48 hours is intense in all forms of leprosy, including the lepromatous form. But similar (though less severe) reactions can be provoked by typhoid bacilli in oil. The late reactions are strongly positive in tuberculoid, but negative in lepromatous cases, but the injection itself sometimes produces a temporary sensitization to lepromin.

DE MESQUITA (p. 616) describes Seabra's photo-oxidasic test in leprosy, which has, apparently, some prognostic significance.

OLMOS CASTRO *et al.* (p. 1010) give the results of a flocculation test which is positive in 73 per cent. of lepromatous cases, but rarely in tuberculoid leprosy, or other diseases.

Clinical Findings

SIMONS (p. 792) describes the clinical features of leprosy.

MANALANG (p. 611) has found histological changes in the clinically normal skin of leprosy patients, and thinks that these may be the sites of future lesions. He holds that infection takes place only in very young children, from skin contact, and quotes evidence for this opinion.

DA VEIGA (p. 1091) describes bone and joint lesions of the hands and feet in various forms of leprosy. The process was chiefly destructive—osteoporosis, rarefying osteitis, cyst-like appearances—and may have been due to vascular disturbance. Osteo-articular lesions were most common in patients with nerve lesions. MONTESTRUC and RAGUSIN (p. 345) describe a case of goundou, apparently due, not to yaws, but to leprosy ; they discuss the bone lesions of leprosy.

WOLCOTT (p. 613) makes the point that erythema nodosum occurring in leprosy is often confused with the acute lepra reaction, and gives certain points of differentiation between the two conditions. SCHUJMAN (p. 1010) quotes evidence which tends to the view that the lepra reaction is often followed by improvement in lepromatous lesions.

OBERMAYER (p. 188) draws attention to the condition described as diffuse lepra, which is a common form of lepromatous leprosy in Mexico and which is usually fatal in about eight years. It develops slowly and may escape detection for some time, but it is highly infective. Cutaneous nodules are absent but there is diffuse infiltration of the skin of the whole body, and a peculiar lepra reaction in which tender erythematous and infiltrated small macules appear, which become necrotic and leave small, sharply-defined, scars. The Mitsuda reaction is persistently negative, indicating lack of resistance.

TISSEUIL (p. 189) describes two forms of late cutaneous lesions; both contain very numerous bacilli.

LENGAUER (p. 608) gives a detailed description of leprosy in the Benin and Warri areas of Nigeria, where there is much lepromatous disease. The evolution of lesions, and quick changes of type, make classification and prognosis difficult, and there is need for research in this rapidly evolving type of the disease. RYRIE (p. 608) describes macular leprosy as he saw it in Nigeria. The multiple macules are manifestations of a second stage of the disease; they are well defined and depigmented, but bacilli are not found and there is no anaesthesia. They may fade, or may spread and become bacteriologically positive, but the prognosis is usually good if treatment is given. ROSS (p. 609) has compared the forms of leprosy seen in parts of the Gambia in which the state of nutrition is poor, with the forms seen in parts of Nigeria. In general the severe forms, and bacteriologically positive cases (even in tuberculoid disease), are more numerous in the Gambia, and in places where the signs of malnutrition are common.

After comparing the relatively high incidence of lepromatous leprosy in Indians in Fiji with that of the Fijians themselves, and remarking on the fact that the Indians show a higher proportion of improved cases than the Fijians, the author of the editorial in the *Leprosy Review* (p. 610) comments that resistance appears to show itself more in the power to combat the disease than in the power to prevent its onset.

In Malaya leprosy is most virulent among the Chinese and least so among the Indians. RYRIE (p. 609) describes the common forms seen in these races, noting that in the Chinese children with early macules, most of them tend to clear up, but about one-quarter develop into tuberculoid lesions which may go on to the lepromatous condition. Active treatment is here necessary in tuberculoid cases to prevent lepromatous change. Hydnocarpus oil by deep subcutaneous injections should be pushed to the limit of tolerance [compare SCHUJMAN below].

SCHUJMAN (p. 92) states that in infants tuberculoid leprosy tends to regress, but this is not so in adults. Treatment with chaulmoogra is useful in this form of the disease.

DE SOUZA LIMA and DE SOUZA CAMPOS (p. 658) have written a book on clinical and histological studies in tuberculoid leprosy, in which the whole subject is discussed. No satisfactory condensation of such a work is possible.

Treatment

BECHELLI (p. 1014) pleads for less rigorous treatment of patients with tuberculoid or uncharacteristic leprosy, unless there is evidence that the condition is deteriorating.

FAGET and ERICKSON (p. 615) sum up the results of treatment with the sulphones, which at Carville have produced better results than any other substances. Progress is seldom evident in less than six months, and is slow but steady, with few relapses. Almost all patients show improvement after three years of treatment, many after much less. In a discussion of treatment, MUIR (p. 711) stated that sulphetrone gives quicker results, and is less toxic, than the other sulphones. Tuberculoid leprosy does not respond well to these drugs, which are most effective in lepromatous cases. Watch should be kept for anaemia, for which iron, liver and yeast should be given. At the same meeting KIRWAN described the eye lesions of leprosy, which are very common. Sulphetrone is safe in doses to a total of 3 gm. each day, and WHARTON (p. 442) reports good results in early lepromatous cases. DAVEY (p. 1012) has obtained relatively very good results in a five-month test of sulphetrone given by mouth in lepromatous leprosy which was not improving on chaulmoogra. The dose was gradually increased to 3 gm. daily for six days each week for six weeks, followed

by two weeks' rest when ferrous sulphate was given ; such courses were repeated. Clinical improvement was great in some (but not all) cases, though bacteriological improvement was not so great. DHARMENDRA and CHATTERJEE (p. 793) describe their experience with diasone and sulphetrone in lepromatous leprosy. The clinical results were good, but bacteriological improvement was not marked ; there was no effect on nerve pains and nerve abscesses, but leprotic ulcers healed and eye conditions improved. It is necessary to keep a constant check on the blood by simple haemoglobin estimation, and if this is done the treatment is safe. For most cases, however, hydnocarpates remain the best drugs for routine use.

FIOL *et al.* (p. 1011) observed improvement in about two-thirds of patients with lepromatous disease, within one year of the start of treatment with promin. The best results were obtained in patients receiving the higher doses (2–3 gm. or more each day). The authors advocate the simultaneous use of chaulmoogra.

Promizole is rather less toxic than the other sulphones, but JOHANSEN and ERICKSON (p. 615) state that it has no other advantages, and that they do not propose to continue its use.

SCHUJMAN and CASTAÑÉ DECOUD (p. 1011) examined skin biopsy specimens from lepromatous patients before and after treatment with chaulmoogra or promin. The improvement was very marked with both drugs.

ROGERS (p. 614) states that chaulmoogra destroys leprosy bacilli in large numbers and leads to improvement in the lesions, but there is a risk of spread of surviving organisms by the blood. It is wise to give treatment with the sulphones for several weeks before pushing chaulmoogra to the point of softening of the lesions and dispersal of the organisms, so that there may be a bactericidal drug in the blood stream. SCHUJMAN (p. 441) writes very favourably of the effect of chaulmoogra in lepromatous leprosy, but makes the proviso that this treatment must be given regularly and in doses of the maximum amount that can be tolerated in the minimum time. When this was done, 40 per cent. of lepromatous patients were rendered clinically and bacteriologically negative, and 40 per cent. were definitely improved. He supports this view (p. 911) by quoting a group of patients who did not improve on 30–50 cc. a month, but who did so on an intensive course of 90–150 cc. a month. CHANDY (p. 713) writes favourably of iodized hydnocarpus oil (prepared so as to contain no free iodine) in lepromatous leprosy. From Brazil, however, DE SOUZA LIMA (p. 714) reports most unfavourably on chaulmoogra, but has obtained excellent results with promin and diasone.

FAGET and ERICKSON (p. 442) have tried streptomycin in leprosy, but although improvement was noted, it was no greater than that achieved with the sulphones, which are less toxic. However, it is too early to judge the value of streptomycin. FITE *et al.* (p. 442) used it as a local application for leprous ulcers, and report satisfactory results.

DE SOUZA-ARAUJO (p. 346) has found that tyrothricin has some inhibitory action *in vitro* on acid-fast organisms isolated from leprosy patients, but it had no curative action when injected into the patients.

FERNÁNDEZ and BERGEL (pp. 911, 1013) report favourably on formaldehyde sulphoxylate of sodium, given intravenously or intramuscularly, in lepromatous leprosy. It is a reducing agent, and they used it for this reason, but they are not sure that this is why it produces its effect.

Although antimony is not a specific for leprosy, DAVISON (p. 714) has found it very useful in the lepra reaction and in tuberculoid disease, in association with other drugs.

In a few cases, administration of the anti-histamine drug benadryl gave some benefit during the allergic lepra reaction ; Box (p. 713) thinks that further trial is indicated.

Good result in the treatment of the leprous reaction is claimed by Fernández *et al.* (p. 1012) who used transfusion of the blood of patients convalescing from that reaction.

Piccardi and Radaeli (p. 1092) have investigated the effect of molybdenum and methylene blue on leprous nodules. The original abstract gives details.

Control

Rotberg (p. 1013) thinks that the fundamental basis of prevention is isolation and treatment of the infective patients. Others, for instance those with tuberculoid leprosy, can remain at home if nasal smears are negative. Contacts should be tested with lepromin ; those who are negative should be examined each week.

Macdonald (p. 1014) has written an account of the agricultural leprosy colony at Itu in S. Nigeria, and the extensive rehabilitation work accomplished there.

Charles Wilcocks

MALARIA

Brumpt, L. C. Paludisme autochtone ou paludisme accidentel. Contribution à la " pathologie par la seringue ". [**Malaria, Indigenous or Accidental. Contribution to " Syringe Pathology ".**] *Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1949, Nos. 9/10, 392–7.

The natural transmission of *P. falciparum* in northern countries is such an exceptional event that the occurrence of such an infection in a patient who could not have acquired it naturally elsewhere demands a careful inquiry into the possibility of the infection having been injected accidentally, intravenously or otherwise, during the course of some therapeutic procedure. Among the cases of indigenous *P. falciparum* reported in France six only appear to the author to have been authentic. Most of the other infections have been acquired accidentally during the intravenous injection of novarsenobenzol. It is pointed out that mycotherapy may be the cause of such infection ; neither penicillin nor streptomycin are schizonticides.

Norman White

Bincer, W. **Malariological Problems in Poland.** *Bull. Inst. Marine & Trop. Med., Med. Acad., Gdańsk, Poland.* 1948, v. 1, No. 1, 59–63, 2 maps.

Because of damage, distress and large-scale migrations of populations, the disasters of war have always contributed to fluctuations in the incidence of communicable diseases. This disturbance of biological balance has been all too clearly illustrated in Central Europe of recent years and has resulted, among other things, in increased intensity and diffusion of malaria or in its appearance where it has previously been absent or latent. Such events have already been noted in the case of Czechoslovakia [this *Bulletin*, 1948, v. 45, 480] and the author now records the situation in Poland up to 1948.

Polish refugees have been repatriated from a very large number of malarious countries and now represent a considerable number of the population. Alteration of frontiers has involved inclusion of highly malarious regions on the Baltic coast and the consequent transfer of potential carriers : the geographical state of Poland in 1939 and 1946, shown in two maps, illustrates this.

Inadequate drainage of fields and marshes, destruction of equipment, lack of men and materials, bombing of water piping and an increase in stagnant pools, have all led to increased breeding of anophelines : ruined houses harbour adult mosquitoes in large numbers and the vast loss of cattle has destroyed an important screen against malaria in man. Scarcity of drugs and insufficient hospital beds for patients with malaria (particularly in 1945, when so many beds were filled with patients having typhus or typhoid) added to the difficulties.

The measures to meet this situation are discussed. The financial position of the country is still too restricted to allow of adequate large-scale control of mosquito breeding, although much has already been done to reclaim marshes on the Baltic coast. Cattle re-population started by UNRRA will take many years to be effective. Drugs have been supplied on a considerable scale in the form of atebrine [mepacrine] and plasmoquine, chiefly from the American Red Cross and of 200,000 tablets of proguanil [paludrine] from the W.H.O. Hospital beds are now available for malaria patients.

Routine malaria surveys are necessary and it is stated that large-scale anti-mosquito measures should be started not later than March. The malaria season begins in April, incidence increases to a peak in July–August, decreases slightly in September and then falls rapidly. Unless very vigorous methods are enforced, an increase over the 1947 morbidity is expected.

The principal vector in Poland is *Anopheles maculipennis messeae.* The infection is that of *P. vivax*, but a new problem has arisen with the influx of repatriates from U.S.S.R., Palestine, and East Africa, with relapsing *P. falciparum* infections among them. It seems unlikely that the local vector or general conditions will allow any major propagation of *falciparum* infection in Poland, but potential carriers should be closely watched, particularly in malarious areas : " the nature of the parasite should be stated in all malaria cases around such a vector ". Constant vigilance such as this on the part of the Public Health authorities is possible in properly organized anti-malaria centres, but microscopes, stains and staff are not always available.

" Should the indicated measures fail (or not be undertaken at all) malaria would develop in Poland to a problem of grave concern to the nation ".

H. J. O'D. Burke-Gaffney

TORANZOS, L. B. Casos de paludismo en el Dep. de Mercedes (Provincia de Corrientes). [**Cases of Malaria in the Department of Mercedes, Corrientes Province.**] *Rev. Inst. Bacteriolog. " Dr. Carlos G. Malbran."* Buenos Aires. 1941, Sept., v. 10, No. 2, 196–7.

The Province of Corrientes, with Brazil, Paraguay and Misiones on its borders, all malarious regions, would naturally be expected to suffer from the same infection, especially with the people's resistance lowered by the great prevalence of hookworm. Nevertheless there is little documentary evidence of malaria in Corrientes. It is known that men and women come from outside to work, in the rice-fields for example, and that they may be carrying malaria. The author, therefore, thinks it important to call attention to four cases, three of which would appear to have been autochthonous. Two came from Mercedes Department and one from the neighbourhood of a plantation on the Corrientes River. One was a woman of 49 years, from Mercedes ; she suffered from chills and heavy sweats and periodic attacks of fever, but no enlargement of liver or spleen. She suffered from double benign tertian malaria. The second was a child of 3 years, brought to the rice-fields on the Corrientes River ; he also had a *P. vivax* infection. The third was a woman of 40 years,

with "*Tertiana duplex*", and with enlarged liver and spleen. The fourth was a man of 40 who had come from Chaco. His blood showed numerous benign tertian parasites. Mercedes lies at the centre of Corrientes Province and the author has found larvae and adults of *Anopheles*; he is at present studying the species. *H. Harold Scott*

MACKERRAS, M. J. & LEMERLE, T. H. **Laboratory Breeding of** *Anopheles punctulatus punctulatus*, **Dönitz.** *Bull. Entom. Res.* 1949, May, v. 40, Pt. 1, 27–41, 7 figs. [11 refs.]

A daily supply of large numbers of young female mosquitoes was required during the wartime investigation into the chemotherapy of experimentally transmitted malaria which was conducted at Cairns, North Queensland, Australia. Other sources having proved inadequate a laboratory colony of *Anopheles punctulatus punctulatus* was eventually established. In this paper the authors describe the equipment which they used and the daily routine which they followed, and also record their observations on the life-cycle and behaviour of this anopheline.

The insectary was 22 feet long, 8 feet wide and 8 feet high. Its eight windows were kept open in summer but were closed in winter when artificial heat was used to maintain the temperature inside the insectary at about 27°C. Direct sunlight never reached the cages in which the adult mosquitoes were kept, but was allowed to fall on the dishes of larvae for part of the day. There were four cages, each 3 feet high and 2 feet square; they had two removable glass sides and two fixed sides of wood, a removable wooden roof and a fixed wooden floor. A strip of moist blanket inside the cages provided damp daytime resting places and maintained a high humidity. Slices of fresh apple were supplied each night and a blood meal was offered; better results were obtained when the female mosquito fed on a human arm than on an animal. Each cage could accommodate 2,000 adults.

Eggs were laid 72 hours after the first blood meal and 48 hours after subsequent meals. The batches of eggs were kept separate so that the exact age was known. Some eggs hatched after a period of desiccation lasting 5½ days. Early batches consisted of 30 to 100 eggs, but later ones contained 200 to 250. Normally eggs hatched in 42 hours. Favourable conditions for larvae were shallow water, food given in small quantities at frequent intervals rather than in large amounts at one time (the food was a proprietary baby food powder), avoidance of overfeeding and overcrowding, a substrate of mud at first and later of sand, and a water temperature of between 32° and 35°C. for at least part of the day. The larval stage lasted from 5 to 8 days. The pupae were always washed in a stream of water when they were being transferred to the pupa dishes. A density of 1,000 pupae per 7 square inches of water surface was found to be ideal. The first pupae to be formed were returned to the breeding cages because they contained a large proportion of male mosquitoes; the later pupae were put into other, special cages where the emerging females were kept awaiting infection. The pupal stage occupied 30 to 40 hours and the emergence rate was between 95 and 100 per cent. Adults usually emerged in the evenings and the females took their first blood meal two days later. They spent the day resting and became active after dusk. Mating and egg-laying took place in flight; when laying her eggs the female hovered about six inches above the water, so that the eggs were scattered and not arranged in groups, a reminder that in nature the breeding places are open pools unobstructed by vegetation. The life-cycle therefore from egg to egg took 13 days. *H. S. Leeson*

McArthur, J. **The *Anopheles* of Tambunan, North Borneo.** *Bull. Entom. Res.* 1949, May, v. 40, Pt. 1, 53–60.

Anopheline surveys made in Tambunan, North Borneo, during 1939 to 1942 resulted in the finding of nearly 48,000 larvae of 12 species and varieties of *Anopheles*. Four species formed 99 per cent. of the collection, namely, *A. barbirostris*, *A. kochi*, *A. maculatus* and *A. philippinensis*. More than 12,000 adults of eight species were captured by various methods, including house searching which yielded only 10 specimens ; human bait trapping (172) ; trapping by native assistants (716) ; jungle searching (1,626) ; and animal bait trapping (10,013). In jungle searching, *A. philippinensis* provided 1,147 specimens and *A. kochi* 447 ; the animal bait traps yielded 4,454 *A. philippinensis* and 4,542 *A. kochi* while searches by local people in their defective mosquito nets gave a total of 574 specimens of *A. leucosphyrus*.

A. leucosphyrus was ultimately proved to be the only vector of malaria in the locality. It breeds in seepages, in dense jungle shade, in the presence of dead leaves. It prefers human rather than animal blood and feeds late at night or early in the morning and departs before daylight.

All the other anophelines in this area are regarded as unimportant as a result of dissections or precipitin tests, or observations on feeding habits or because of their scarcity. In addition to those already mentioned the author includes notes on *A. karwari*, *A. tessellatus*, *A. barbumbrosus*, *A. ludlowi* (one female and no larvae), and *A. aitkeni* (larvae only of the typical form and three varieties). *H. S. Leeson*

Reid, J. A. **A Preliminary Account of the Forms of *Anopheles leucosphyrus* Dönitz (Diptera : Culicidae).** *Proc. Roy. Entom. Soc. of London.* Ser. B. 1949, Apr. 15, v. 18, Pts. 3/4, 42–53, 2 figs. [25 refs.]

It it now known that *Anopheles leucosphyrus* is an efficient vector of malaria in Assam, Borneo and Burma. The systematics of this species are discussed and at least six varieties are recognized, four of which occur in Malaya. These varieties are described and a key is given to the identification of the females. *H. S. Leeson*

Frohne, W. C. & Hart, J. W. **Overwintering of *Anopheles crucians* Wied. in South Carolina.** *J. National Malaria Soc.* 1949, June, v. 8, No. 2, 171–3, 2 graphs.

" In the vicinity of Manning, South Carolina, *Anopheles crucians* survives the winter wholly in the aquatic stages, and undergoes retarded larval development. In contrast, hibernation by the inseminated female is typical for local *A. quadrimaculatus*, while *A. punctipennis* here breeds actively all winter."

Menk, W. Bluttransfusion und Malaria. [**Blood Transfusion and Malaria.**] *Muench. med. Woch.* 1944, July 14, v. 91, Nos. 27/28, 349–52. [18 refs.]

A general review and discussion.

Boventer, K. Ueber die Gefahr der Malariauebertragung durch Blutkonserven. [**The Danger of Transference of Malaria Infection by Preserved Blood.**] *Med. Klin.* 1949, May 20, v. 44, No. 20, 644–5.

Until the late war it was customary, before carrying out blood-transfusion, to ensure that constitutional diseases such as tuberculosis and syphilis were

excluded. Then, when men returned from the tropics, reports of inoculated malaria in the tropics began to increase and next came the fear of similar occurrences in non-tropical countries in certain cases where blood was taken from those who had come back from the tropics. Blood kept for three days was then thought to be safe, but this was soon proved wrong and, first, eight days and then three weeks were the periods recommended. Instances have, however, been recorded in which the blood of subjects who have not for many years lived in the tropics and have had no attacks of malaria for long periods has transferred infection. In order to avoid all risk the blood of the donor should be examined, says the author, in thick drop for parasites and by the Henry reaction. [The author in his experimental work has shown that *P. vivax* might remain viable and transmissible in blood kept for 13 days and *P. falciparum* for 21 days. See this *Bulletin*, 1949, v. 46, 799.]

H. Harold Scott

STRANSKY, E. **On Pernicious Attacks of Malaria in Childhood.** *J. Trop. Med. & Hyg.* 1949, July, v. 52, No. 7, 140–44.

A description is given of three fatal cases of malignant tertian malaria in children in the Philippines.

Case I. A Filipino girl aged 12, coming from a region where malaria is endemic. One week before admission to hospital the patient developed a low-grade fever which became intensified. Moderate but continuous headache, pains in the chest and vomiting were present. On admission the child looked weak, pale and jaundiced. Owing to abdominal tenderness the liver and spleen could not be palpated; there were no nervous symptoms but haemorrhages and petechial spots were present, especially on the eyelids, face and arms.

A microcytic anaemia was present (colour index 0·57), a leucocytosis of 39,800 per cmm., marked anisocytosis, poikilocytosis, polychromatophilia, microcytosis, hypochromia and numerous target cells were found. Many ring forms and some schizonts, merozoites and crescent forms of *Plasmodium falciparum* were present in blood smears. The findings suggested an acute haemolytic anaemia. Aralen [chloroquine] by mouth was given, but the patient died 36 hours after admission.

Autopsy showed the liver to be slightly enlarged and slate-coloured and the spleen twice the normal size and slate-coloured; petechial haemorrhages were found in the cortex and medulla of the kidneys, while numerous malaria parasites were seen in smears of the brain, spleen, liver and kidneys, together with degenerative changes in the liver cells. This was a case of extremely severe infection with *Plasmodium falciparum* of long standing, with an acute exacerbation and severe anaemia.

Case II. A Filipino girl aged 4 years and 9 months, who, for the 7 months before admission had lived in an area where malaria is endemic. The chief complaints were fever, cough, headache, abdominal pain and loss of appetite, and 24 hours before admission oedema of the legs developed. On admission, the child was strikingly pale but not jaundiced. *Ascaris* ova were numerous in the faeces and blood examination showed marked anisocytosis, poikilocytosis, polychromatophilia, microcytosis and hypochromia. Nearly every red cell contained malaria parasites—rings, a few schizonts and crescents of *P. falciparum*, while most of the monocytes and many granulocytes showed pigment. The patient died suddenly the day after admission; the temperature did not rise above 101°F. Owing to collapsed veins quinine had to be given intramuscularly. At autopsy the most important findings were slate-coloured grey matter in the brain with prominent blood vessels and pin-point haemorrhages, massive deposition of malarial pigment in spleen, kidneys, liver and brain, while numerous malaria parasites were found in the above organs.

Case III. A boy aged 3 years was admitted to hospital with complaint of anaemia, infrequent micturition and high-coloured urine. The patient had been ill for a fortnight previously and also came from a region where malaria was endemic and on admission was pale, jaundiced, with a temperature of 102·2°F. and pulse of 160. The spleen but not the liver was palpable. Marked anisocytosis, poikilocytosis, polychromatophilia, microcytosis and hypochromia were present, together with numerous target cells and nucleated red blood cells. "A few ring and crescent forms" [presumably of *P. falciparum*] were found in the peripheral blood. The child died the day after admission; the clinical diagnosis before blood examination was that of acute haemolytic anaemia.

At autopsy, the spleen was found to be enlarged to twice the normal size; the brain, except for some congestion and oedema without any malarial pigment, was normal; and histological examination showed no characteristic findings of cerebral malaria.

Death was "sudden and unexpected" in these three cases, and two patients showed signs of cerebral malaria and acute haemolytic anaemia. Pernicious attacks of malaria may develop in childhood without characteristic symptoms. [So they can in adults. In the reviewer's experience this type of case is almost invariably fatal. The chief interest in this paper lies in the very full laboratory and post-mortem examinations.] *C. F. Shelton*

v. Haller, E. Die Erkrankungsdauer der Malaria (insbesondere der Malaria tertiana). [**The Duration of Malaria Infection, especially Benign Tertian.**] *Ztschr. f. Hyg. u. Infektionskr.* 1948, Aug. 17, v. 128, Nos. 3/4, 379–87, 1 fig. [25 refs.]

The author defines "duration of infection" as the period between the last time of infection and the cessation of the last symptom. He quotes from the literature the times which previous authorities have stated; these have ranged between wide limits, from 18 months to 8 years. He next states his own experience of 1,262 soldiers in the Adriatic region, and Sardinia, none of whom showed any symptoms 18 months after infection with *P. vivax*. He quotes Boyd and others that in inoculated malaria relapses, if they occur more than two months later, indicate inefficient treatment.

In subtertian infection, if the patient remains free from fever for eight weeks and parasites are not seen in a thick drop specimen of the blood, the infection can be regarded as cured and "in unfavourable cases" the infection, he states, has died out within a year. The quartan parasite is much more resistant and can remain active in the body for more than 10 years. [In view of the varied statements of well-known authorities, readers will require more than the mere *ipse dixit* of the author that his findings are of universal application. See also this *Bulletin*, 1948, v. 45, 970.] *H. Harold Scott*

Cooper, W. C., Ruhe, D. S., Coatney, G. R., Josephson, E. S. & Young, M. D. **Studies in Human Malaria. VIII. The Protective and Therapeutic Action of Quinacrine against St. Elizabeth Strain Vivax Malaria.** *Amer. J. Hyg.* 1949, Jan., v. 49, No. 1, 25–40, 6 figs. [22 refs.]

During the testing of antimalarial drugs in prisoner volunteers at Atlanta the maximum effects to be expected from quinacrine [mepacrine] in the prevention or cure of the St. Elizabeth strain of *P. vivax* were determined so as to provide an adequate basis for comparison with new drugs which were being tested at near-toxic doses.

White male volunteers were each bitten by 10 *A. quadrimaculatus* infected with the St. Elizabeth strain of *P. vivax*. Each mosquito after it had bitten three

volunteers in turn was dissected to determine sporozoite densities. Volunteers were kept under close supervision for 18 months ; infections with this strain of *P. vivax* usually exhibit a short early period of activity soon after infection, and a prolonged late period beginning 6 to 12 months after infection.

Quinacrine was given as the hydrochloride, U.S.P., in tablets, each containing 0·1 gm. of the salt. Dosages are expressed in terms of the salt. Five men were given quinacrine for four days before, on the day of, and for six days after the day of infection. The dosage was 0·8 gm. (0·2 every 6 hours) on the first day, then 0·4 gm. on each of the succeeding 10 days—4·8 gm. in all. Quinacrine plasma levels approached equilibrium at about 30 microgrammes per litre, about the fourth day after exposure. They did not fall below 10 microgrammes per litre till more than 4 weeks after exposure. These five men had their primary attacks of malaria 242 to 350 days after mosquito bites. Four of five untreated controls simultaneously infected had their primary attacks 13 to 16 days after exposure : the other control had a late primary attack. The delayed activity in the patients protected by quinacrine was characterized by one to three late attacks per patient.

Another group of five volunteers was similarly treated but the administration of 0·4 gm. quinacrine was continued for 20 days after exposure. Each man received in all 10·4 gm. in 25 days. Mean plasma concentrations of quinacrine from day 0 to day 21 ranged from 102 to 148 microgrammes per litre, and did not fall below 10 microgrammes until more than nine weeks after exposure. These five men had primary attacks from 278 to 323 days after exposure : five untreated controls had their primary attacks 13 to 14 days after exposure.

Quinacrine was used therapeutically in 55 acute attacks of this strain of *P. vivax*. Nineteen patients were treated during early attacks, *i.e.* those beginning during the first 60 days after infection. Dosage varied in these cases. In no case was there further early activity of the infection, but in 18 of the 19 patients late relapses occurred from 178 to 364 days after the last dose of drug.

Twenty-five late attacks occurring six months or more after exposure were treated with 2·8 gm. quinacrine in six days, 0·2 gm. every six hours on the first day, 0·1 gm. every six hours for the next five days. Treatment was begun on or before the fifth day of patent parasitaemia. Five of eight first late attacks, five of eleven second late attacks and none of six third late attacks were followed by relapse at intervals of from 30 to 66 days from end of treatment. In every case where the last day of treatment was on or before day 305 the patient subsequently relapsed. No case where treatment ended after day 351 showed further evidence of infection.

Three late attacks were treated with larger doses of quinacrine 5·2 gm. in 12 days. Each of the three had one additional relapse 39, 42, and 43 days after the last dose of drug.

Five patients who were given suppressive quinacrine 0·1 gm. daily from the end of treatment of their late primary attacks through the 14th month after exposure to infection exhibited no further evidence of infection.

No serious toxic effects were encountered during these experiments and no course of therapy had to be modified. There were three instances of nausea, two of vomiting and three of diarrhoea. *Norman White*

Ruhe, D. S., Cooper, W. C., Coatney, G. R., Josephson, E. S. & Young, M. D. **Studies in Human Malaria. IX. The Protective and Therapeutic Action of SN 6911 (Sontochin) against St. Elizabeth Strain Vivax Malaria.** *Amer. J. Hyg.* 1949, Jan., v. 49, No. 1, 41–8, 5 figs. [11 refs.]

The procedure in carrying out these experiments in prisoner volunteers has been described in the authors' paper dealing with quinacrine [above].

SN6911 [Sontochin] was given as the bisulphate monohydrate in tablet form, each tablet containing 0·1 gm. of base. Dosages are expressed in the terms of the base.

Five volunteers were given SN6911 four days before infection, on the day of infection, and on each of the six following days, 0·8 gm. on the first day and 0·4 gm. on each of the following ten days, 4·8 gm. in all. They did not develop patent malaria until 277 to 332 days after infection. Four of five untreated controls had early primary attacks 13 to 16 days after infection. The drug was well tolerated, but three of the men had some abdominal distress.

Five volunteers were similarly treated but the medication was continued for 20 days after exposure to infection. They all developed primary attacks 225 to 297 days after infection. Five untreated controls all developed primary attacks 13 to 14 days after infection. All five treated men had gastro-intestinal symptoms, four had anxiety symptoms, insomnia, headache and irritability; all developed a fine tremor of the hands.

Five control subjects were treated with SN6911 during their initial attacks, 2·8 gm. in six days—0·8 gm. on the first day, 0·4 gm. on each of the remaining four days. Fever disappeared in two to three days, parasites in from three to four days. All five patients had late relapses 205 to 296 days after the end of treatment.

Four late primary attacks, 9·5 to 10·5 months after exposure, were similarly treated. Further activity developed in three of these patients 37 to 46 days after the end of treatment. There were no toxic manifestations during the therapeutic trials that might not have been caused by malaria.

SN6911 was not causally prophylactic or curative though it was effective in suppressing and interrupting malaria attacks caused by the St. Elizabeth strain of *P. vivax*. *Norman White*

COATNEY, G. R., RUHE, D. S., COOPER, W. C., JOSEPHSON, E. S. & YOUNG, M. D. **Studies in Human Malaria. X. The Protective and Therapeutic Action of Chloroquine (SN 7618) against St. Elizabeth Strain Vivax Malaria.** *Amer. J. Hyg.* 1949, Jan., v. 49, No. 1, 49–59, 7 figs. [13 refs.]

The procedure adopted in these experiments was described in the authors' paper dealing with quinacrine [above]. Chloroquine diphosphate was given in capsules or tablets each containing 0·1 gm. of base. Dosages are expressed in terms of the base. Each of five volunteers was given chloroquine on four days before infection with the St. Elizabeth strain of *P. vivax*, on the day of infection, and on the six following days—0·8 gm. on the first day, 0·4 gm. on each of the succeeding ten days, 4·8 gm. in all. They all developed primary attacks of malaria between 254 and 308 days after exposure to infection. Five controls developed malaria 13 to 15 days after exposure. In the treated men, detectable concentrations of chloroquine, above 10 microgrammes per litre, were still present in the plasma 60 days after exposure. The high doses were well tolerated: one subject complained of blurring of vision, insomnia and diarrhoea, and another of mild epigastric distress during the first three days of medication.

Five volunteers were treated as above, save that the medication was continued for 20 days after infection. Because of high plasma concentrations, 1,575 to 1,890 microgrammes per litre, doses were reduced during the last six days of therapy. The total amounts given were from 8·3 to 8·4 gm. in 25 days. They all developed primary attacks from 256 to 309 days after exposure to infection. The five controls developed patent malaria 13 to 15 days after exposure. All five treated subjects complained of dizziness or blurring of

vision which cleared, however, either during or soon after the period of drug administration. Weights, red and white blood cell counts and urine analyses remained normal throughout.

Chloroquine was used in the treatment of 12 early and 11 late attacks of St. Elizabeth strain *P. vivax* malaria. The early attacks were in controls or in subjects who had received inadequate suppressive medication. The late attacks were relapses beginning later than six months after exposure. Treatment was begun on the fifth day of patent parasitaemia, 0·8 gm. on the first day followed by 0·4 gm. a day from 1·5 to 5 days. Clearance of parasites and subsidence of fever was rapid in all the early attacks but relapse invariably occurred 164 to 293 days after the end of treatment. Relapses occurred after the treatment of four of seven first late attacks and one of four second late attacks, parasites becoming patent 53 to 85 days after the end of treatment. In the total 23 attacks treated, parasites were cleared from the blood in from one to four days, mean 2·3 days, and fever was terminated in one to two days, mean 1·2 days.

In spite of great activity against erythrocytic parasites chloroquine was neither prophylactic nor curative against the St. Elizabeth strain of *P. vivax*.

Norman White

Cooper, W. C., Ruhe, D. S., Coatney, G. R., Josephson, E. S., Young, M. D. & Burgess, R. W. **Studies in Human Malaria. XI. The Protective and Therapeutic Action of SN 6771 against St. Elizabeth Strain Vivax Malaria.** *Amer. J. Hyg.* 1949, Jan., v. 49, No. 1, 60–66, 5 figs.

SN6771 is 6,6′-diallyl-α, α′-bis (diethylamino)-4,-4′-bi-o-cresol. Its value in the suppression and treatment of infections with the St. Elizabeth strain of *P. vivax* was tested in the manner described above. SN6771 dihydrochloride, 3·0 gm. of base a day, was given to five volunteers for four days before infection, on the day of infection, and for six days after infection. Two men developed early primary attacks on the 16th day ; two showed early transient parasitaemia but did not develop typical primary attacks till 282 and 291 days after exposure to infection. The remaining subject showed no sign of malaria till 285 days after exposure. Five controls had early primary attacks 13 to 15 days after infection.

In five other volunteers the administration of SN6771 was continued for 20 days after exposure : their primary attacks were delayed until 258 to 304 days after infection. Each man then had one or two malaria attacks. The 25-day courses were well tolerated ; two subjects complained of nausea.

Nineteen late attacks of malaria were treated with SN6771, 2·0 gm. a day for six days. Parasitaemia and fever were abolished in all cases, but the process was slow—two to ten days (mean 5·3) for the clearance of parasites, and five days for the removal of fever. Infections became repatent 10 to 16 days after treatment. Relapses occurred after each of the eight first late attacks and after four of seven second late attacks.

Norman White

de Mello, J. P. **Fifty Years of War against Malaria.** *East African Med. J.* 1949, June, v. 26, No. 6, 155–7.

A brief historical review.

Cambournac, F. J. C. Modernos processos de combate ao sezonismo. [**Modern Antimalaria Measures.**] *An. Inst. Med. Trop.* Lisbon. 1948, Dec., v. 5, 321–39. English summary (6 lines).

A review and a discussion.

FLOCH, H. & ABONNENC, E. Poissons larvivores de la Guyane Française. [**Larvivorous Fish of French Guiana.**] *Institut Pasteur de la Guyane et du Territoire de l'Inini. Publication No. 132.* 1946, Aug., 6 pp., 2 figs.

BULL. INST. HYG. MAROC. 1947, v. 7, 119–24, 1 map & 1 chart. La lutte antipaludique au Maroc en 1947. [**Antimalaria Campaign in Morocco in 1947.**]

Malaria in Morocco in 1947 was of average severity. The aestivo-autumnal outbreak was very mild in the Atlantic endemic areas, but at half-way heights along the Middle Atlas and South of the Rif serious epidemics were experienced. The spring rainfall, which determines the degree of anophelism in the Atlantic areas, was 20 per cent. below the mean in the two chief endemic areas, Gharb and South of Rabat. In the Middle Atlas there were heavy winter rains in the south causing an abnormal anopheline density in the spring, and heavy spring rains in the north which favoured high summer anophelism.

Experiments were made with DDT as a larvicide. Gyron, a powder containing 5 per cent. DDT, and solutions of 5 per cent. and 2·5 per cent. DDT in crude oil were used. The solutions gave good results: applied in amount equivalent to 1 gm. DDT per square metre of water treated the larvicide effect lasted more than a month. The spraying of habitations with DDT gave less satisfactory results. A concentration of 1 gm. per square meter of surface was immediately effective but anophelines reappeared 15 days later.

The large reclamation scheme of the Merjas du Gharb continues. Supervision of irrigation and drainage canals calls for more attention than it has hitherto received. Extensions of irrigation have been responsible for the spread of malaria to areas which were formerly free from that disease.

Experiments were made to compare the efficacy of quinacrine [mepacrine], nivaquine and paludrine in the clinical suppression of malaria. Paludrine and nivaquine gave comparable results; they were both more effective than quinacrine. *Norman White*

NOÉ, J., BERTIN, V., GUTIÉRREZ, J. & NEGHME, A. Diez años de lucha antimalarica en Chile. [**Ten Years of Antimalaria Effort in Chile.**] *Riv. di Parassit.* Rome. 1949, Mar., v. 10, No. 1, 5–24, 2 figs. (1 map). [10 refs.] English summary.

The only part of Chile in which malaria was endemic is its northernmost Province Tarapaca, between 18° and 21·5°S. Here malaria had been endemic from time immemorial. The endemic afflicted the port of Arica and the sparsely populated valleys of Lluta, Azafa, Vitor, Camarones, Pica, and some others of lesser importance that run westward from the mountains to the Pacific. The climate is mild. In summer, January to April, the maximum temperature oscillates between 26° and 36°C., in winter, July to September, between 20° and 27°C. The minimum temperature at these seasons varies between 16° and 20°, and 6° and 16°C., respectively. Heavy rains in the mountains in the summer cause flooding of the rivers. The two largest centres of population are Arica with 15,000 and Pica with 2,500 inhabitants.

The seasonal incidence of malaria was constant: the curve rose sharply in January, reached its height in March–April, and then fell as steeply as it had risen: from July to December the incidence was low. *P. vivax* and *P. falciparum* infections both occurred, the former predominating. In the summer half the population were afflicted, but the malaria was mild and the mortality practically nil. Foreign visitors were rapidly infected.

A. pseudopunctipennis was the sole vector. *A. pseudopunctipennis* is a complex of subspecies and it seems that *A. p. typicus* was less important

in the transmission of malaria than other of the subspecies. It could be found breeding from sea-level to a height of 2,220 metres, in streams rich in algae, exposed to sunlight, in shallow pools with gently running water and in casual collections of water. An overall sporozoite index of 1 per cent. was reported and oöcyst indexes of 0·9 to 2·3.

In 1937 an antimalaria campaign was begun under the direction of the late Professor Noé. Attention was first paid to the town of Arica and the adjacent Azapa Valley and extended year by year to the rest of the infected territory. At first, old well-tried methods were adopted; thorough treatment of acute attacks, suppressive treatment, antilarval measures including minor drainage, oiling, water tidiness, herbage packing, and the use of *Gambusia*. In October 1944, DDT came into use and the results of its use have been dramatic. Dwellings and outhouses have been systematically sprayed. DDT was also used as a larvicide. Domestic cattle have also been sprayed with dilute aqueous suspensions of DDT.

Since April 1945 not a single indigenous case of malaria has been diagnosed; the only cases of malaria treated have come from neighbouring countries, Peru, Bolivia or Ecuador. It is claimed that anophelism has been eradicated from Arica and all the once malarious valleys. "Chile is perhaps the only American country in which both malaria and anophelism have been eradicated."

Norman White

See also p. 1027, CORRADETTI, **Esperimento di prevenzione della verruga peruviana e della malaria nella valle del Rio Santa Eulalia (Perù).**

COULSTON, F. **Exoerythrocytic Stages of** *Plasmodium cynomolgi* **in the** *Macaca mulatta*. *Proc. Soc. Exper. Biol. & Med.* 1949, Feb., v. 70, No. 2, 360–64, 1 fig. [16 refs.]

In the opening paragraphs the statement is made that SHORTT and GARNHAM [this *Bulletin*, 1948, v. 45, 388, 762] in describing pre-erythrocytic development of *Plasmodium cynomolgi* "suggested that the exo-erythrocytic stages developed in hepatic cells. . . ." This is scarcely correct as these authors in their description left no room for doubt that such development did occur in hepatic cells, and this has never been questioned. As regards the possibility of development in other cells or tissues (as the present author points out) they state ". . . so far, tissue stages of the parasites have only been found in the liver."

In the experiments described in the paper under review, nine monkeys were infected with sporozoites. The infective material was sporozoites either from salivary glands of dissected mosquitoes or from the thoraces of mosquitoes, in both cases ground in a glass mill. Control experiments with uninfected mosquitoes were also carried out in three monkeys. The experiments performed are dealt with below individually.

In experiment 1, a monkey was inoculated intravenously with the ground thoraces of 178 heavily infected mosquitoes [the percentage presumably infected is not stated], and was examined at necropsy 6 days and 20 hours later. In sections of the liver "several small segmenters and schizonts were observed in the liver in Kupffer cells (Fig. 1) and in the spleen in large mononuclear phagocytic cells, probably reticular in nature." It is also stated that no parasites were found in undoubted liver cells. [No indication is given of how "small" the schizonts were and the illustration of one of these bodies shows insufficient detail for useful comment.]

In experiment 2, a monkey received two inoculations directly into the liver with 18 and 24 heavily infected salivary glands at different sites. Biopsies

of these sites, after 47 and 89 hours respectively, disclosed a few schizonts "some of which appeared to be in Kupffer cells." It is not stated where the remainder appeared to be.

A second biopsy over the 47-hour site, taken 9 days and 18 hours after inoculation and the day after detectable parasitaemia, revealed numerous parasites in the liver sinusoids in a circumscribed area. These parasites were schizonts, segmenters or merozoites, the latter being free in the lumen. These parasites were "often associated with the Kupffer and littoral cells." [An obvious comment on this statement is that surely this would be inevitable once the parasites were in the sinusoids, and SHORTT & GARNHAM have described and figured the release of merozoites into the sinusoids.]

It is also stated that "other parasites were found in cells which could not be identified; these may have been hepatic cells."

On the same animal a splenic biopsy was performed 11 days and 18 hours after inoculation. It is stated that "large bodies resembling schizonts and segmenters were observed in the venous sinuses, the pulp veins and the trabecular veins. Despite this resemblance, the similarity of these forms to white thrombi raises a serious question as to whether they were exo-erythrocytic stages." It is further stated that the cellular reaction within and surrounding these structures resembled the reaction associated with segmenting exo-erythrocytic stages of *P. cynomolgi* by earlier investigators. [This seems hardly a suitable comparison seeing that previous accounts referred to the liver and not to the spleen.]

In experiment 3, the liver of a monkey was inoculated at two sites, with 28 and 27 heavily infected salivary glands respectively. Liver biopsies were performed after 94 and 144 hours, but only the 94-hour site could be located microscopically.

Schizonts and pre-segmenters [the difference between these is not clear] were found and these varied in size between 15 and 38 μ in diameter. [The development of a form of 38 μ in diameter from a sporozoite in less than four days is difficult to comprehend.] The parasites were chiefly in Kupffer cells but some were in hepatic cells. It is stated that the reaction area at the inoculation site was composed chiefly of degenerating liver cells, mosquito débris, heterophils, eosinophils, and a large variety of mononuclear phagocytic cells typical of an active inflammatory host response.

In experiment 4, the monkey was given an intravenous inoculation of the ground thoraces of 223 heavily infected mosquitoes and was sacrificed five days and 19 hours later. Liver and spleen biopsies were made at 44 and 87 hours after inoculation. Air-dried Giemsa-stained smears of the liver at the post-mortem showed five exo-erythrocytic parasites with nuclei varying in number from 5 to 26. It was not possible to determine the types of the host cells. Considering the fact that the post-mortem was performed nearly six days after inoculation, the small number of nuclei is difficult to account for and no explanation is given.

In the specimen obtained at the biopsy made at 44 hours, small parasites resembling the metacryptozoites of avian malaria were found in the Kupffer cells and this is suggested as indicating the probability that cryptozoic segmentation occurs about the 40th to 48th hour after infection. A further statement is made that in none of the histological preparations did the parasites show large vacuoles.

A series of control experiments with normal uninfected mosquitoes was carried out, with negative results.

A short discussion compares the morphological characters of the pre-erythrocytic stages of *P. cynomolgi* with those of avian malaria parasites, of *Hepatocystes kochi*, of *Leucocytozoon* and of *Haemoproteus*.

[In considering the details of the experiments it is felt that certain points in the description are left somewhat vague. It is not made clear what is meant by the term " biopsy ", *i.e.*, whether it refers to a specimen removed by splenic or liver puncture or a specimen of spleen or liver tissue removed by open operation. Again, where inoculations were made into liver directly, it is not stated whether the liver was first exposed by operation in order to make more accurate the location of the respective inoculations.

Another point to be noted is that it is at least open to question whether results obtained by the crude process of direct inoculation of mosquito tissues into the liver, with the consequent damage to the tissues and the subsequent reaction of the latter, represent conditions in which the data can be fairly compared with those obtained under the more normal conditions which follow the bites of infected mosquitoes.

The paper would appear to bring out some major points of difference when the findings are compared with those obtained in previous work. Thus the impression gained from it is that the author emphasizes that the location of the exo-erythrocytic stages is in cells of the reticulo-endothelial system, in both liver and spleen, rather than in the hepatic cells. Another fundamental point of difference is that in experiment 3, the occurrence is reported of schizonts as large as 38μ only 94 hours after inoculation. This is the more remarkable if, as the author suggests, there is an earlier cryptozoic stage which matures at 40 to 48 hours after inoculation, as the implication would then be that the parasite had grown to a size of 38μ in about 48 hours.

Beyond these remarks further comment would not be justifiable without examination of the actual preparations illustrating the conclusions drawn in the paper.] *H. E. Shortt*

MANWELL, R. D. & FEIGELSON, P. **Glycolysis in** *Plasmodium gallinaceum.* *Proc. Soc. Exper. Biol. & Med.* 1949, Apr., v. 70, No. 4, 578–82, 3 figs.

The authors adapted, with limited success, the technique of BALL and colleagues [this *Bulletin*, 1945, v. 42, 867], to the culture of erythrocytic forms of *P. gallinaceum* and made a detailed study of the glucose requirements of the parasite. The strain was maintained by inoculation of 3-week-old chickens with brain suspensions or parasitized blood by the intramuscular or intraperitoneal routes. Blood was collected from the chicken heart, in presence of heparin, during the rise of infection and used in the rocking apparatus of BALL *et al.* The hourly rate of glucose consumption was estimated for undiluted normal and parasitized blood on which differential counts were made. The amount of glucose metabolized by reticulocytes was made possible by rendering chickens anaemic through administration of phenylhydrazine. It was found that the adult chicken red cell uses glucose at about one-seventh the rate of reticulocytes. Depending on the stage of development of the parasite, a parasitized cell on average used twice as much glucose as a reticulocyte. A formula was developed, based on several assumptions, by which the glucose consumption of blood with known cell content could be calculated. The results agreed well with theory and the method should be of value in indicating the probable glucose consumption in culture material. *J. D. Fulton*

JOSEPHSON, E. S., TAYLOR, D. Jane, GREENBERG, J. & NADEL, E. M. **The Ascorbic Acid Content of the Adrenal Glands of Chicks infected with** *Plasmodium gallinaceum.* *J. National Malaria Soc.* 1949, June, v. 8, No. 2, 132–6, 1 fig. [14 refs.]

" The adrenal ascorbic acid concentration in the chick, an animal which requires no dietary ascorbic acid, was unchanged during the course of a

blood-induced malarial (*P. gallinaceum*) infection. There was an absolute increase in ascorbic acid per gland proportional to the degree of adrenal hypertrophy observed during the course of the infection.

" Daily injections of 10 mg. of ascorbic acid had no effect upon the course of parasitemia, day of death, or degree of adrenal hypertrophy.

" Withholding of food and water from chicks for 5 days resulted in no change in the adrenal ascorbic acid concentration."

BLACKWATER FEVER

TRINCÃO, C. Pode a exsanguino-transfusão aplicar-se ao tratamento da febre biliosa hemoglobinúrica ? [**Can Exchange Transfusion of Blood be of Service in Blackwater Fever ?**] *An. Inst. Med. Trop.* Lisbon. 1948. Dec., v. 5, 263–8. [13 refs.] English summary.

By *exsanguino transfusão* the author seems to imply the complete substitution of the blood of the donor for that of the patient. Taking the quantity of blood of an adult as 5,000 cc., he says that introduction of three times this amount, with simultaneous withdrawal of that of the patient, will be necessary to replace 95 per cent. of the patient's blood. Among the causes for which such a procedure might be needed is blackwater fever, in order to remove the haemolysins circulating in the patient's blood ; to relieve the patient from metabolizing his haemoglobin and its derivatives set free in the circulation, and, lastly, to repair the acute anaemia. He recalls MAEGRAITH's studies to the effect that the anuria of blackwater fever is due to renal anoxia and not to blockage of the renal tubules [see this *Bulletin*, 1945, v. 42, 10, 968 ; 1947, v. 44, 44] and thinks his method worth a trial. One difficulty would be to obtain so large a quantity on the spot as 15,000 cc. of compatible blood. *H. Harold Scott*

TRYPANOSOMIASIS

KLEINE, Friedrich Karl. **Ein deutscher Tropenarzt.**
This book is reviewed on p. 1101.

LALOUEL, J. La trypanosomiase dans le Bas-Oubangui de 1907 à 1948. [**Trypanosomiasis in Bas-Oubangui (French Equatorial Africa) from 1907 to 1948.**] *Bull. Soc. Path. Exot.* 1949, v. 42, Nos. 5/6, 229–38. [10 refs.]

This is a historical review of the incidence and distribution of sleeping sickness in the Bas-Oubangui or Ibenga-Motaba Sector of French Equatorial Africa ; the area includes the basins of the rivers Ibenga, Motaba, and Likouala-aux-Herbes, corresponding to the three districts of Impfondo, Dongou and Epéna [PIOT (this *Bulletin*, 1920, v. 16, 364) gave a sketch-map of the area and described it as situated along, and to the west of, 300 km. of the river Oubangui which separates it from the Belgian Congo]. The Sector was created in 1918 but tours of inspection and treatment were made from 1907 to 1948 ; the results as regards the distribution and incidence are shown in figures, with comments on changes in local populations and on factors influencing the spread of the disease. The number of existing cases, the index

(percentage of the population) of total morbidity, index of new infections, and index of circulating virus (trypanosomes present in the blood) for 1947 were as follows :—

	Impfondo	*Dongou*	*Epéna*
Number of cases	484	819	629
Index of new cases	2·5	0·4	1·08
Index of circulating virus ...	2·6	0·4	1·12
Index of total morbidity, theoretical	13	7·4	8·4

A comparison with the figures for previous years shows that on the whole there has been a considerable improvement in the sleeping sickness position in the area. *J. F. Corson*

FERREIRA, F. S. da C. Relatório do Chefe da Missão de Estudo e Combate da Doença do Sono na Guiné referente a 1947. [**Report of the Head of the Mission for the Study and Campaign against Sleeping Sickness in Portuguese Guinea in 1947.**] *An. Inst. Med. Trop.* Lisbon. 1948, Dec., v. 5, 407–44, 2 figs.

The organization of the work was still incomplete in 1947 owing to shortage of staff and money but more was done than in 1946 ; 81,042 people were examined and 782 cases of sleeping sickness were diagnosed (in 1946 the corresponding figures were 15,689 and 404). The remaining population not yet examined numbered 250,000. Polymorphic trypanosomes were found in the three species of tsetse flies present, *viz. Glossina palpalis*, *G. longipalpis* and *G. submorsitans* ; of 1,456 flies dissected 52 (3·6 per cent.) showed polymorphic trypanosomes. The sleeping sickness patients were treated by injections of drugs but details and results are not given in this report. The Commission also investigated the prevalence of guineaworm, filariasis, schistosomiasis, ankylostomiasis and leprosy. [See also this *Bulletin*, 1948, v. 45, 1069, 1070 ; 1949, v. 46, 530.] *J. F. Corson*

i. VANDERPLANK, F. L. **The Classification of** *Glossina morsitans* **Westwood (Diptera, Muscidae), including a Description of a New Subspecies, Varieties and Hybrids.** *Proc. Roy. Entom. Soc. of London.* Ser. B. 1949, Apr. 15, v. 18, Pts. 3/4, 56–64, 1 map & 3 pls. (1 coloured).

ii. ——. **Variation in the Male Genitalia of the Tsetse Fly** *Glossina pallidipes* **(Austen) and a Note on** *G. austeni* **(Newstead).** *Ibid.* 65–8, 1 map.

iii. ——. **The Classification of** *Glossina palpalis*, **including the Descriptions of New Subspecies and Hybrids.** *Ibid.* 69–77, 1 fig., 1 map & 2 pls.

i. The first paper contains descriptions of a new subspecies of *Glossina morsitans* (*orientalis*), and of three new races of *G. m. submorsitans* (*congolensis*, *ugandensis* and *gambiensis*). Separation into subspecies and races is based on morphological differences in male genitalia. A map shows that these forms of *G. morsitans* are geographically isolated from one another ; subspecies *morsitans* occurs in parts of Southern and Northern Rhodesia and in western and central Tanganyika [the distribution in Bechuanaland is not mentioned or shown on the map] ; subspecies *orientalis* occurs in the eastern parts of Tanganyika, in Nyasaland and in the northern parts of Portuguese East Africa ; subspecies *submorsitans* and its race *gambiensis* occupy a belt in West Africa running east from the mouth of the Gambia river to a point south-east of Lake Chad ; east of this is a wide gap and then another fly belt, occupied by race *ugandensis*

running along the Sudan-Congo border country into Uganda ; race *congolensis* is shown as occurring in a vast area in central and southern Belgian Congo and in the north of Angola.

On the same map the distribution of *G. swynnertoni* in Northern Tanganyika is also indicated.

Descriptions are given of hybrids produced by crossing the various forms of *G. morsitans* ; the abdomens and male genitalia of these are illustrated.

ii. In the second paper the author records that a few cross-breeding experiments between *G. pallidipes* from different areas produced no significant differences in the offspring ; that he has not yet been able to cross the West African *G. longipalpis* with *G. pallidipes* and that slight differences observed in the male genitalia of *G. austeni* do not suggest that any races of this species exist. A map shows the distribution of these three tsetse flies ; *G. pallidipes* and *G. austeni* in East Africa and *G. longipalpis* mainly in West Africa but also in the south-east corner of Belgian Congo. [In the text it is stated that *G. pallidipes* occurs in Bechuanaland—this is surely an error ; it is not marked on the map.]

iii. The third paper is on the same lines as the first. The subspecies of *G. palpalis* which are described are *G. p. palpalis, G. p. martinii, G. p. fuscipes* and two new ones *G. p. gambiensis* and *G. p. angolensis*. Relevant portions of the male genitalia are illustrated, by drawings and by photographs, and a map shows the distribution of the subspecies. *G. p. fuscipes* occurs in Southern Sudan and in Uganda. [The extensive distribution shown on the map as existing along the courses of the river Nile and its tributaries in the Sudd region of southern Sudan is an error, as also is the absence of any indication of the presence of *G. p. fuscipes* along the Sudan-Congo border.] *G. p. martinii* occurs along the upper parts of the Congo River and its tributaries, around Lake Tanganyika and as far south as Lake Bangweulu in Northern Rhodesia. *G. p. palpalis* is found along the lower reaches of the Congo River and along its northern tributaries, along the west coast and the course of the Niger River. Of the two new subspecies, *G. p. angolensis* is distributed along rivers in the west of Angola and *G. p. gambiensis* is found in Gambia and Senegal. [The northerly limits of *G. palpalis* in West Africa shown on this map are far beyond those given by NASH (this *Bulletin*, 1949, v. 46, 224).]

Descriptions are also given of hybrids produced by crossing various subspecies of *G. palpalis* with each other. None of these hybrids is likely to be encountered in nature because the subspecies are so widely separated.

The author has deposited his preserved material in the British Museum for future reference. These important papers should be studied in the original by entomologists interested in these flies. *H. S. Leeson*

JACKSON, C. H. N. **The Biology of Tsetse Flies.** *Biol. Reviews.* 1949, Apr., v. 24, No. 2, 174–99. [97 refs.]

Selected field and laboratory studies on the biology of tsetse flies are summarized in this review. After the introduction the subject is conveniently dealt with under the following heads : reproductive cycle ; the teneral fly ; the non-teneral fly ; digestion ; food and feeding habits ; and density and activity. Most of the literature quoted relates to *Glossina morsitans, G. palpalis* and *G. tachinoides*, but there are also references to researches on *G. swynnertoni, G. austeni, G. pallidipes, G. longipalpis, G. brevipalpis*, and *G. fuscipleuris*. Many of the papers discussed have been abstracted in this *Bulletin* and some of them are quoted in *Review Monograph No. 1* published in 1946 by The Bureau of Hygiene & Tropical Diseases. [It is assumed that temperatures are given in degrees Centigrade.]

The reproductive cycle of tsetse flies varies with the temperature but not with the humidity. At 23° [C.] it occupies a minimum period of 55 days, 33 of which are spent as pupae. Pupae are able to withstand slight frost and development proceeds at temperatures between 16° and 31° [C.]; at temperatures above 40° [C.] they are killed after various periods of exposure. The natural pupal mortality rate varies from zero to 50 per cent. according to temperature.

Adults of some species tolerate slight frost for short times; exposures to 38° [C.] or over may be lethal especially if the humidity is high. *Glossina morsitans* and *G. swynnertoni* may live about four weeks in nature but at low temperatures survival depends on saturation deficit. Females commonly live twice as long as males. *G. morsitans*, *G. palpalis* and *G. tachinoides* are most active at about 27° [C.] and are inactive outside the limits 15·5° and 41·5° [C.].

G. swynnertoni, *G. longipalpis* and *G. pallidipes*, and to a great extent *G. morsitans*, have a mammalian diet, while *G. palpalis* and *G. tachinoides* take much nucleated blood and are scarcely affected by the absence of ungulates. *G. pallidipes* is only slightly attracted to man and is active on moonlight nights; *G. austeni* is often active in complete darkness.

These are only a few of the points touched on in this summary which concludes with a valuable list of the most important works on the subject of biology of tsetse flies from 1907 to 1948. *H. S. Leeson*

MEM. ACAD. SCI. IST. BOLOGNA. 1946–47, Ser. 10, v. 4, 19 pp., 2 figs. Descrizione della prima infezione contratta in laboratorio da *Trypanosoma evansi*. [**First recorded (Human) Laboratory Infection by** *Trypanosoma evansi*.]

This record is of historical interest. In April, 1912, Professor Lanfranchi was studying animal trypanosomes, *T. brucei* and *T. evansi*. He was drawing up blood from a heavily infected guineapig with a pipette when the cotton-wool plug became dislodged and, soaked in blood, entered his mouth. He was suffering at the time with an ulcerated left tonsil. He spat out the plug but continued at his work thinking that there was no risk as the trypanosome with which he was working was "an animal trypanosome and not pathogenic for man." Later he gargled. Thereafter, he suffered from access of fever (there had been rise of temperature for some time owing to the tonsillitis) and sweats "so profuse that it passed through the mattress and wetted the floor" [as mentioned below the patient's recollection for recent events at the time was poor], insomnia, tachycardia paroxysmal in character, enlargement of liver and spleen and lymphatic glands, with loss of memory for recent events and pain in the thumbs and forearms sufficiently acute in the right to prevent his using the right hand for picking up and holding objects. Trypanosomes were present in his blood and these were measured by Mesnil and others; much detail is given of the comparison between these and those of human sleeping sickness (called in this paper Castellanosis). Treatment by atoxyl brought about cure. By measurements and by serological tests Professor Mesnil concluded that the trypanosome which infected Professor Lanfranchi was *T. evansi*.

H. Harold Scott

LE ROUZIC, J. Deuxième note sur les premiers essais de chimio-prophylaxie en Afrique Occidentale Française par la Pentamidine. [**Second Note on the First Trials of Pentamidine as a Prophylactic Agent against Sleeping Sickness in French West Africa.**] *Bull. Méd. de l'Afrique Occidentale Française*. 1948, v. 5, No. 1, 89–91.

Later results are given of the field experiment on pentamidine prophylaxis described by BRUN-BUISSON *et al.* [this *Bulletin*, 1949, v. 46, 123]. The previous

report showed that six months after prophylactic treatment no infection was discovered among 1,002 treated persons, while there were 19 cases among the 902 controls (2·1 per cent. infection rate). A follow-up 12 months after treatment now shows only three new cases among the treated persons (0·29 per cent. infection rate) and 28 among the controls (3·1 per cent. infection rate).

In view of these favourable results, this form of chemoprophylaxis is to be applied to 15,000 people in the forest regions of Guinea and Casamance.

E. M. Lourie

OESTERLIN, M. Beitrag zum Problem der Arzneifestigkeit der Trypanosomen. [**Contribution on the Problem of Drug-Resistance in Trypanosomes.**] *Zent. f. Bakt.* I. Abt. Orig. 1941, Aug. 1, v. 147, No. 5, 335–8.

The author discusses the relationship between certain types of chemotherapeutic interference and acquired drug-resistance; for interference the point of fixation of the drug on the trypanosome is presumed to have been impaired by the interfering substance, while for resistance the same point of fixation has been impaired by the chemotherapeutic agent itself. Somewhat tenuous reasoning then leads the author to expect that by exposing arsenic-resistant trypanosomes to potassium hexatantalate the resistance might be reduced. The main points of the argument seem to be :—

(i) The impairment of the trypanosome's receptors which gives rise to resistance is a mechanism of self-protection on the part of the trypanosome cell;

(ii) Potassium hexatantalate damages the protective mechanisms of laboratory animals (by interfering with phagocytosis);

(iii) Why, then, should it not upset also the protective mechanisms of humbler creatures, *i.e.*, resistant trypanosomes, especially since it may be assumed from interference experiments [MORGENROTH and ROSENTHAL, *Sleeping Sickness Bulletin*, 1911, v. 3, 115 and 301; SCHNITZER and SILBERSTEIN, this *Bulletin*, 1927, v. 24, 571] that the trypanosome cell has the same points of attachment for potassium hexatantalate as for certain arsenicals and antimonials?

(iv) Potassium hexatantalate is readily diffusible, and so should be readily absorbed by the trypanosome cell, thus providing an excellent opportunity for exercising its influence.

Trypanosomes were separated by centrifugation from heavily infected mouse blood and washed two or three times in Ringer solution containing 0·1 per cent. glucose until the surrounding fluid was free of protein. They were then suspended for 1 to 2 hours [temperature not stated] in a solution containing 0·9 per cent. sodium chloride, 0·1 per cent. glucose and 0·1 per cent. "Tantalat (Schering A. G.)", after which they were inoculated into fresh animals.

In this way the resistance was found to be diminished after 4 to 7 passages [presumably repeating the above procedure after each passage, though this is not explicitly stated]. With restored arsenic sensitivity there was also restoration of the trypanosome's property of fluorescence on contact with trypaflavin or styrylquinoline. The trypanosome used is described merely as "*der arsenfeste Stamm I/28 der* I. G. *Farben Höchst a.* M."

[These are very interesting findings. Nothing is said about how long the restored arsenic sensitivity lasted on subsequent repeated animal passage. To cause permanent disappearance of drug-resistance would be a considerable achievement. For previous efforts in this direction see STEINFELD, this *Bulletin*, 1940, v. 37, 698.]

E. M. Lourie

LEÓN, L. A. Información sobre el problema de la enfermedad de Chagas en el Ecuador. [**Report on the Chagas's Disease Problem.**] *Bol. Oficina Sanitaria Panamericana.* 1949, June, v. 28, No. 6, 569–85, 1 map. [25 refs.] English summary.

This account is of considerable interest, historically, epidemiologically and entomologically. Chagas's disease has probably existed in Ecuador for a long time, for *Triatoma dimidiata*, the common vector there, was recorded by Stål in Guayaquil nearly 100 years ago. In 1921, RUBIO observed a rare form of palpebral oedema [now known as Romaña's sign] and VALENZUELA suggested the existence of the disease there. Nevertheless the infection is not rife. In the last 20 years only 18 cases have been reported, 9 of either sex, 10 in adults, 8 in children, 14 acute cases and 4 chronic and, so far, only one fatal. Five species of *Triatoma* are found in Ecuador: *T. dimidiata*, the chief vector. Crespo in 1947 found 25·9 per cent. of 748 positive in Guayaquil. *T.d. capitata*, really a subspecies of the last, has been found naturally infected and is easily infectable in the laboratory. *T. carrioni*, also infectable experimentally. *Mestor* (*Panstrongylus*) *rufotuberculatus*, probably synonymous with *T. coxorufa*, has been found naturally infected. *T. venenosa*, found in Costa Rica, Panama, Colombia and elsewhere, but rare in Ecuador and, if potentially a vector, is of little importance there. *Rhodnius prolixus* has also been found in Ecuador; being a known vector elsewhere, it may be, and probably is, so here also. The chief reservoir host is said to be *Didelphys azarae* [misspelt *azarea*] Azara's opossum [called in this paper a fox] or *D. paraguayensis*. Though cases are not many, it is said that the infection is spreading and the Government is urged to take steps in time to improve the housing and to get rid of the insect vectors.

H. Harold Scott

PINTO, C. Factos curiosos sobre a biologia do "Triatoma sordida". Nota Prévia. [**Some Interesting Facts about the Biology of the "*Triatoma sordida*".**] *Rev. Brasileira Med.* Rio de Janeiro. 1949, May, v. 6, No. 5, 305.

The English summary appended to the paper is as follows:—

"1. *Triatoma sordida*, one of the transmitters of Carlos Chagas disease (Trypanosomiasis cruzi) is capable of laying eggs through meshes of about one square millimeter. These eggs can be projected at one inch distance out of the vessel where females are kept.

"2. The complete evolutionary cycle of *Triatoma sordida* takes only five months from egg to egg, and took place from September to February in laboratory cultures kept in Rio de Janeiro."

CORNEJO, A. Enfermedad de Chagas-Mazza. Xenodiagnóstico. Modificación de Borzone al método de Brumpt. [**Chagas's Disease. Borzone's Modification of Brumpt's Method of Xenodiagnosis.**] *Semana Méd.* 1949, July 28, v. 56, No. 30, 181–3, 4 figs.

Brumpt's original method of applying to the forearm of the patient the uninfected bugs in a Mazza apparatus covered with gauze was modified by Romaña and Gil who used a test-tube whose mouth was covered by the skin of a recently killed mouse or guineapig, the tube containing a sample of the suspected blood, defibrinated or citrated, and introduced this into one with a wider mouth containing 5 or 6 of the bugs to be infected. Borzone's modification consists in collecting 10 cc. of blood in a dry syringe. When the blood reaches the laboratory it is placed in a watch-glass or some such receptacle

and 4–6 larvae of *Triatoma infestans* feed on it under cover of a bell-jar and some dark material, to resemble night-time during which the insects usually bite. When engorged they are set apart at 37°C. and their faeces can be examined from time to time during the 2 months for which the vectors are usually kept before final testing for diagnosis. *H. Harold Scott*

LEISHMANIASIS

TRINCÃO, C. A inoculação da *Leishmania donovani* em culturas *in vitro* de medula óssea e nos ovos embrionados de galinha. [**Inoculation of Bone-Marrow and of Fertilized Hen-Eggs with** *Leishmania donovani*.] *An. Inst. Med. Trop.* Lisbon. 1948, Dec., v. 5, 141–7, 1 pl. [15 refs.] English summary (5 lines).

Several investigators have found that when Leishmania were inoculated into tissue cultures their survival time was inverse to the rapidity of growth of the tissue, whereas in the yolk-sac of the hen's egg they developed well. The author's studies have confirmed these findings. In the first 24 hours of the marrow cultures the leptomonas forms appeared to increase in numbers, but after 24 hours they became scarce and in 2 days none could be seen. The marrow of a healthy person was tried first and then that of one with myeloma, but the results were the same. The question arose : Was this due to the medium being unsuitable or was it due to phagocytosis ? Closer study showed that phagocytosis was intense and early and the phagocytes themselves then rapidly degenerated.

With fertilized eggs the results were very different. Six-day-old fertilized eggs were inoculated in the yolk sac and inoculated at 37°C. When they were examined on the 20th day leptomonas forms were numerous and the normal development of the embryos had not been checked in any way. Such a method would seem therefore, to be an excellent one for preserving strains in the laboratory. *H. Harold Scott*

FENG, L. C. & LU, W. C. **The Survival of** *Leishmania donovani* **in** *Ornithodorus moubata*. Reprinted from *Peking Natural History Bull.* 1949, v. 17, No. 4, 241–3. [10 refs.]

" 1. Experiments showed that *Leishmania donovani* could live in the gut of *O. moubata* for at least 25 days.

" 2. The Leishmania parasites did not develop into flagellates in the tick."

TRINCÃO, C. Valor da cloridro-gelificação do soro no diagnóstico do kala-azar. [**The Value of the Hydrochloric Acid Gelification Reaction in the Diagnosis of Kala Azar.**] *An. Inst. Med. Trop.* Lisbon. 1948, Dec., v. 5, 135–9. [11 refs.] English summary (6 lines).

[See this *Bulletin*, 1949, v. 46, 127.]

TRINCÃO, C. A siderémia no kala-azar. [**Serum Iron in Kala Azar.**] *An. Inst. Med. Trop.* Lisbon. 1948, Dec., v. 5, 131–4. [11 refs.]

The English summary appended to the paper is as follows :—

" The determination of the serum iron in 16 cases of visceral leishmaniasis demonstrates that in every case the serum iron values are normal, or increased. Consequently a defect in the iron absorption cannot explain the anemia of the disease."

TRINCÃO, C. O mielograma no kala-azar. [**The Myelogram in Kala Azar.**] *An. Inst. Med. Trop.* Lisbon. 1948, Dec., v. 5, 99–118. [46 refs.]

The English summary appended to the paper is as follows :—

" The writer studies the sternal marrow pattern in 5 cases of visceral leishmaniasis of the adult. In every case the bone marrow was active, but the ripening and mitoses curves demonstrated an inhibition of the blood cell production."

TRINCÃO, C. O esplenograma no kala-azar. [**The Splenogram in Kala Azar.**] *An. Inst. Med. Trop.* Lisbon. 1948, Dec., v. 5, 119–29. [17 refs.]

The English summary appended to the paper is as follows :—

" The author studies the splenic picture of 13 cases of visceral leishmaniasis, 3 of which were in adult patients. The differential counts vary widely. The number of reticulo-endothelial cells, erythroblasts and granuloblasts is increased."

RUCCI, E. Emazie a bersaglio nella leishmaniosi viscerale umana. [**Target Cells in Kala Azar.**] *Acta Med. Italica.* 1949, July, v. 4, No. 7, 169–70.

The English summary appended to the paper is as follows :—

" The picture of red cells ' a bersaglio ' [target cells] has already been described in the haemoparasitosis (leucocytegregarinose, trypanosomiasis of the animals, human malaria) : the author describes the same picture in the visceral leishmaniosis of the children. The picture is demonstrable in the spleen and not in the peripheric blood."

LEONARDI, G. & PINNA, R. Sui risultati terapeutici dell'antimoniato di n-metilglucamina in un caso di leishmaniosi viscerale resistente al tartrato di sodio e antimonile. [**Treatment of a Case of Visceral Leishmaniasis by N-methylglucamine of Antimony.**] *Acta Med. Italica.* 1949, June, v. 4, No. 6, 147–50, 1 fig. [17 refs.] English summary.

The usefulness of antimonials in certain tropical diseases is well known but, owing to low grades of tolerance or fear of symptoms of intolerance in even therapeutic doses, new compounds are constantly being manufactured and tried. The patient whose case is recorded here was a man of 35 years who had had malaria in 1946 and recovered. In June 1948 he suffered from fever and sweats which continued intermittently and in September he had pain in the left hypochondrium, the spleen was found to be enlarged and puncture revealed leishmania. Sternal puncture showed that the marrow was crowded with leishmania. He was given intensive treatment with sodium antimony tartrate [dosage not stated], but without effect and a new pentavalent antimonial was tried, *Glucantim* or N-methyl-glucamine antimoniate, injected intramuscularly, 10 cc. of a 30 per cent. solution. The preparation itself contains 28·35 per cent. of antimony and doses of 15 and even 20 cc. a day were well tolerated. Altogether " 22·55 gm. of Sb. were given in 18 days " [*sic* ; these are the figures presented ; but it seems incredible that such very large doses of antimony could be given. See this *Bulletin*, 1947, v. 44, 56] : The splenic enlargement began to show reduction after a very few days and within a fortnight had receded almost to the costal margin ; leucocytes had risen to 5,000 per cmm. ; differential count gave polymorphonuclears 38, large mononuclears 8, lymphocytes 51, eosinophiles 3 per cent. Red corpuscles

numbered 2,480,000, Hb. 56 per cent., and the patient's general condition improved rapidly. Examination of the bone marrow revealed a marked reduction of leishmania on the 12th day and none on the 18th day.

H. Harold Scott

DE SOUSA, M. T. & DE ALMEIDA, L. Kala-azar infantil stibio-resistente. Tratamento pela lomidine. [**A Case of Infantile Kala Azar resistant to Antimony treated with Lomidine.**] *Gaz. Méd. Portuguesa.* 1949, v. 2, No. 2, 481–8, 1 fig. [21 refs.]

It has been said that if cases of infantile kala azar were reported as resistant to antimony this was due to the dosage being inadequate. This charge can certainly not apply to the patient whose case is described here. Clinically, it was typical and the description is given in much detail with the results of repeated blood examination. This may be summarized by saying that, in spite of repeated courses of injections of neostibosan and blood transfusions, after slight transient improvement, the condition became gradually worse, till the child's state was very precarious. Red cells were down to 1,860,000, leucocytes 2,400 per cmm., Hb. 40 per cent., neutrophiles 33, eosinophil 1, lymphocytes 62, plasmocyte 1, metamyelocytes 3 per cent. A fresh drug was then tried, antimoniate of N. methylglucamine, known commercially as Glucantime, but a week later the corpuscles had fallen to 1,350,000 and the Hb. to 30 per cent. A new drug was then given a trial, dimethanosulphonate of 4-4′-diamidino diphenoxy-pentane, or, commercially, Lomidine. This was given intramuscularly for 15 doses on alternate days in a 2 per cent. solution in physiological saline, starting with 0·5 cc., then 0·75, 1·0, 1·5 cc., etc. to 3·0 cc. At the same time the patient was given liver extract, iron and vitamins B_1 and C. In 3 weeks, the temperature, which had been falling gradually, came to normal; the red cell count increased steadily and in 3½ months the corpuscles numbered 3,100,000, leucocytes 4,600 per cmm., Hb. 65 per cent. A second series, this time of 14 injections, had been started after an interval of 17 days, beginning with 1 cc. of the 2 per cent. solution and rising to 3 cc. After another interval, of 40 days, a third course was given, although everything appeared to be going well and the blood count then gave red cells 3,600,000, leucocytes, 5,000 per cmm., Hb. 70 per cent. (Sahli); the general condition was good, the spleen palpable but only 2 cm. below the costal margin, and the child's weight had increased by 17·5 kgm.

H. Harold Scott

CORRADETTI. A. Studi sulla epidemiologia della leishmaniosi cutanea nella regione del medio Adriatico. I. Incidenza della leishmaniosi cutanea nella zona compresa tra il Tordino e il Vomano. [**Epidemiology of Cutaneous Leishmaniasis in the Adriatic Region. I. Incidence in the Zone between the Tordino and Vomano Rivers.**] *Riv. di Parassit.* Rome. 1948, Dec., v. 9, No. 4, 227–8.

The English summary appended to the paper is as follows :—

" An epidemiological survey in the province of Teramo (Abruzzi) has shown that of 28,599 people examined, 6,790 (23·7 %) were affected by either actual (2·9 %) or cicatrised (20·8%) cutaneous leishmaniasis."

FORBES, M. A., Jr. **Exogenous Cutaneous Leishmaniasis proved by Culture.** *Arch. Dermat. & Syph.* 1948, Sept., v. 58, No. 3, 301–7. [Refs. in footnotes.]

A short account of the history of this disease is given. [There is a reference to CUNNINGHAM (1855); the author writes " Cunningham described the histologic

picture and stated that there were bodies within the cells which were circular to elliptic in shape." Actually, in an illustration in Cunningham's paper, these bodies are shown ; they are typical leishmania.]

This is followed by a short description of a case of oriental sore in a student from Aleppo, Syria. He left Aleppo in August 1946. In February and March, 1947, respectively, small lesions, red papules, appeared on the dorsum of his left hand and left ear. These developed into typical oriental sores. Smears showed leishmania. Later, cultures were taken by injecting isotonic saline into the periphery of the lesions and withdrawing it ; this material was inoculated into NNH medium and flagellates developed.

The lesions were surgically excised with 1 cm. of normal skin surrounding them. The wounds healed, but six months later a small nodule appeared 1 cm. proximal to the operation scar on the left hand. This also showed leishmania, but 4 months later it had healed spontaneously.

The author discusses the dangers of the disease becoming endemic in the United States, and the importance of cultural methods to confirm the diagnosis. In support of the latter point, he quotes DOSTROVSKY & SAGHER [this *Bulletin*, 1947, v. 44, 1056]. [In view of the absence of any known vectors and the rarity of all *Phlebotomus* species in the United States, the danger of the establishment of this disease can scarcely be very real, and culture is surely unnecessary where unmistakable leishmania, *e.g.* as shown in the illustration accompanying the author's paper, are found in smears. The main point of the writers quoted was that cultures are frequently positive in the absence of leishmania in the smears.] *L. E. Napier*

HOEPPLI, R. & FENG, L. C. **A Comparative Study of Skin Lesions caused by Leishmania, Demodex and Sarcoptes in Dogs and Cats.** Reprinted from *Peking Natural History Bull.* 1949, v. 17, No. 4, 245–50, 6 figs. on 3 pls.

FEVERS OF THE TYPHUS GROUP

PRATT, E. P., DRYSDALE, A. D. & KIRK, R. **Typhus Fevers in the Anglo-Egyptian Sudan.** *J. Trop. Med. & Hyg.* 1949, Aug., v. 52, No. 8, 157–60.

Fevers of the typhus group are rare in the Anglo-Egyptian Sudan ; between 1898 and 1941 there is no record of the occurrence of any case.

In 1937 Weil-Felix tests were carried out on 1,000 sera sent from all parts of the Sudan for the Kahn or Widal tests, for investigation in cases of fever of unknown origin, or for the purposes of the special enquiry. Only two positive reactions were obtained, in one case the titre with *Proteus OXK* was 1–500, and in the other there was a *Pr. OX2* reaction at 1–250. In neither case could the significance of the reaction be determined.

Sera of 240 rats were tested ; none was positive at a titre of 1–50 with any strain of *Proteus*.

In 1939 sera of 222 persons were tested against *Pr. OXK* in connexion with the investigation of trachoma ; one woman, aged 80, reacted at a titre of 1–125, but no association with a typhus fever could be discovered.

Two cases already reported are mentioned ; one was a case which occurred in Juba in 1941 and was described by SOMERS as one of tick typhus, with a *Pr. OX2* reaction of 1–1,250 and a *tache noire*. [See this *Bulletin*, 1946, v. 43, 327] the other was a case which occurred in 1943 in the Gezira region, described by STEPHENSON as a problem case with a *Pr. OXK* titre of 1–2,500. [See this *Bulletin*, 1945, v. 42, 553.]

In 1943 an isolated case of typical typhus occurred in Khartoum ; the *Pr. OX19* titre was 1–500, but the source of infection could not be discovered.

In 1943–44 there were 22 cases of louse-borne typhus in Wadi Halfa on the Egyptian border ; these were obviously associated with the epidemic in Egypt. Rigorous precautions were taken to prevent the spread of infection and no further case occurred in the Sudan. *John W. D. Megaw*

KRYŃSKI, S. & WOYCIECHOWSKA, S. **Investigation into the Problem of Artificial Feeding of Lice by way of Intrarectal Injections as applied by Weigl.** *Bull. Inst. Marine & Trop. Med., Med. Acad., Gdańsk, Poland.* 1949, v. 2, Nos. 1/2, 59–60.

Those interested in the cultivation of rickettsiae in lice will find a number of useful hints in this note.

In the artificial feeding of the insects *per rectum*, stress is laid on the importance of haemoglobin and glucose as ingredients of the nutritive enemata.

John W. D. Megaw

KRYŃSKI, S. & WOJCIECHOWSKA, S. **Influence of various Factors upon Virulence and Vitality of *Ri prowazeki* in Laboratory Breeding by Weigl's Method.** *Bull. Inst. Marine & Trop. Med. Med., Acad., Gdańsk, Poland.* 1949, v. 2, Nos. 1/2, 49–58, 2 charts.

Great variations were observed in the virulence to lice of different strains of *Rickettsia prowazeki* which were repeatedly passaged through lice by Weigl's method, but after a long series of passages the variations in virulence became much less.

No association with seasonal influences could be detected to account for the changes in virulence and rate of growth occurring during repeated passages through lice.

The author studied the influence of various factors on virulence, including the rickettsial concentration of the suspensions used, duration of the period of retention of the inoculum in the lice, exposure to light, action of phenol, methylene blue, and copper [presumably copper sulphate].

John W. D. Megaw

VARGUES, R. Intérêt de la technique cutanée dans le dosage comparé des rickettsies. [**Points connected with the Intracutaneous Technique in the Estimation of the Comparative Virulence of Rickettsiae.**] *Ann. Inst Pasteur.* 1949, May, v. 76, No. 5, 462–5.

Suspensions of three strains of *Rickettsia prowazeki* were tested by the Giroud intradermal test. It was found that suspensions made in milk, diluted egg-yolk, or nutrient broth, were more suitable for maintaining the virulence of the rickettsiae than those made in distilled water, saline or glucose solutions.

The former group of suspensions, when lyophilized, retained their virulence for long periods and were suitable for use in the test after resuspension in any suitable medium. *John W. D. Megaw*

BIELING, R. & OELRICHS, Lilly. Toxoidartige Antigene der *Rickettsia prowazeki.* [**Toxoid Antigens of *Rickettsia prowazeki*.**] *Ztschr. f. Hyg. u. Infektionskr.* 1948, Aug. 17, v. 128, Nos. 3/4, 250–54.

By immunizing rabbits with the non-toxic supernatant fluid obtained by centrifuging fresh suspensions of living *Rickettsia prowazeki*, a serum was obtained which was capable of neutralizing rickettsial toxins by converting them into toxoids.

The serum also had pronounced anti-infectious properties, though these were not so great as those of standard immune sera.

The serum when added to rickettsial suspensions, whether fresh or after treatment by heat or disinfectants, converted the toxic factor to a toxoid, so that it is possible to prepare a vaccine of high potency and low toxicity.

For details of the experiments the original paper must be consulted.

John W. D. Megaw

FRANK, H. R. Die Serumtherapie des klassischen und murinen Fleckfiebers. Grundlagen, Ergebnisse, Indikation. [**Serum Therapy of Classical and Murine Typhus.**] *Ztschr. f. Hyg. u. Infektionskr.* 1948, Aug. 17, v. 128, Nos. 3/4, 294–330, 1 fig. [125 refs.]

This paper is really a comprehensive, though concise, monograph on the serum therapy of louse-borne and murine typhus. In two bibliographies there are 125 references to the literature up to the year 1948.

The author's personal experience is described in six pages out of the 36 of which the paper consists. Altogether 22 patients were treated but only eight of the cases are described ; in these the treatment was started before the appearance of a rash, which, in fact, never developed in unmistakable form, presumably because of the inhibiting action of the serum. The diagnosis was confirmed by the occurrence of a rising-titre Weil-Felix reaction which was positive with dilutions of 1–1,600 to 1–6,400. Two of these cases are of special interest ; the treatment was started on the 2nd day with intravenous doses of 99 and 90 cc. of convalescent serum, and further doses ranging from 52 to 120 cc. were given on each of the following two days. In both cases the temperature fell nearly to normal two days after the first dose was given and remained nearly normal till the 8th and 9th days, respectively, when there was a further spell of fever which lasted two days in each case and apparently yielded to two additional doses of serum.

All but one of the other six cases belonging to this group were very mild, but three of them had been inoculated and in one of the uninoculated patients a high temperature persisted till the 8th day in spite of two injections of serum given on the 4th and 5th days.

Little is said of the 14 cases in which the treatment was started after the appearance of the rash ; from a table it appears that the average duration of the fever was 14·6 days ; almost the same as in the 26 untreated controls in which it was 14·9 days.

The rest of the article consists of a critical, fully documented, review of the literature. The conclusions reached were that serum treatment started before the appearance of the rash was strikingly effective and that there were clear indications of its value up to the 5th day. Treatment started between the 5th and 9th days appeared in some cases to have had a favourable effect, but after the 10th day it was useless.

[The situation was greatly changed since the author wrote the present article. The proved efficacy of chloromycetin and aureomycin is likely to discourage the use of specific antisera, especially as these have a restricted sphere of efficacy and availability.]

John W. D. Megaw

PEREIRA, H. G., TRAVASSOS, J. & VASCONCELOS, J. V. Tifo murino no Rio de Janeiro. I. Ocorrência de ratos naturalmente infectados. [**Murine Typhus in Rio de Janeiro. Natural Infection among Rats.**] *Hospital.* Rio de Janeiro. 1949, May, v. 35, No. 5, 679–87. [11 refs.] English summary.

Nine out of the first 50 rats examined by the authors in Rio de Janeiro gave positive reactions with the complement-fixation and rickettsia-agglutination

tests for murine typhus. Two strains of *Rickettsia mooseri* were isolated from the sera of the only four reacting rats that were tested by guineapig inoculation ; each strain was obtained from the pooled sera of two rats.

Only four of the nine reacting rats gave positive Weil-Felix reactions, at titres of 1–80 ; 1–320 ; 1–320 ; and 1–640, respectively, and only two of these four had given positive reactions with the other tests. An attempt was made, without success, to isolate rickettsiae from the rat whose Weil-Felix titre was 1–640 ; this was one of the rats that gave negative reactions with the other tests.

There was a striking degree of correlation between the complement-fixation and rickettsia-agglutination tests ; the titres observed were 1–20 to 1–320 with the former, and 1–40 to 1–320 with the latter test.

John W. D. Megaw

GISPEN, R., SMIT, A. M. & WESTERMANN, C. D. **Epidemic Scrub Typhus in Batavia.** *Documenta Neerlandica et Indonesica de Morbis Tropicis.* Amsterdam. 1949, June, v. 1, No. 2, 134–41, 1 fig. [12 refs.]

The author describes an outbreak of scrub typhus in which 20 persons living in Batavia City were attacked between December, 1947 and May, 1948. There were probably many more cases which were not detected.

The Weil-Felix titres (*Proteus OXK*) ranged from 1–800 to 1–6,400 ; an eschar occurred in four cases, and rickettsiae were isolated from two of the patients.

Although the outbreak was in an urban area 13 of 15 patients whose previous movements were known had been in close contact with tall *alang* grass [referred to as *lalang* grass in many reports] growing by the side of a canal, so that the disease occurred in association with conditions of the rural type.

Rats infested with *Trombidiidae* larvae were caught in and near the houses at the border of the grassy area.

John W. D. Megaw

JONES, H. L., Jr. & KING, J. A. **Tsutsugamushi Disease. Report of a Case.** *U.S. Nav. Med. Bull.* 1949, July–Aug., v. 49, No. 4, 724–6. [10 refs.]

" A case of tsutsugamushi disease (scrub typhus) is presented. Among the unusual features encountered were : (*a*) the petechiae on the buccal mucosa ; (*b*) the presence of a positive Weil-Felix, OXK, in the patient's dog ; and (*c*) the important epidemiological fact that this is the first authenticated case, to our knowledge, that has been reported in China."

HAYASHI, H. & WATANABE, M. **On the Possibility of Appearance of Rickettsiae in the Circulating Blood after the Recovery of [? from] Rickettsiosis.** *Kitasato Arch. Exper. Med.* 1948, Nov., v. 21, No. 2, 135–41.

The blood of a patient convalescent from an attack of tsutsugamushi disease was found infective up to at least 92 days after defervescence. The patient had been inoculated for therapeutic purposes with the Pescadores strain of rickettsia, and infectivity was tested at intervals. On each occasion a dose of typhoid vaccine was given and the blood sample was taken two hours after the end of the febrile reaction that resulted. On three different occasions a person inoculated intravenously and subcutaneously with the blood developed a typical attack of tsutsugamushi disease with a rising-titre Weil-Felix reaction of the *Proteus OXK* type.

In another experiment on the same lines a person inoculated with blood from an infected patient 34 days after defervescence developed a very mild

attack, but by a series of passages, first through a rat and then through a series of mice, rickettsiae were isolated. *John W. D. Megaw*

SMADEL, J. E., JACKSON, Elizabeth B. & CRUISE, Anita B. **Chloromycetin in Experimental Rickettsial Infections.** *J. Immunology.* 1949, May, v. 62, No. 1, 49–65, 2 figs. [15 refs.]

Chloromycetin was shown to have a pronounced rickettsiostatic action when introduced into chick embryos infected with *Rickettsia tsutsugamushi* [*orientalis*] *R. mooseri*, *R. akari*, *R. prowazeki*, and *R. burneti*.

The average prolongation of the life of the embryos was usually slightly greater when the injections were made half an hour before inoculation with the infecting rickettsiae than in those injected 24 or 48 hours after inoculation, but in the case of *R. burneti* the prolongation was greatest in a batch of embryos treated 42 hours after inoculation.

Mice infected with lethal doses of the Karp and Kostival strains of *R. tsutsugamushi* nearly always survived after treatment with suitable doses of the drug, given intraperitoneally or orally. The Serangayee and Buie strains were much more resistant to the drug, which had to be given in larger doses and for longer periods to obtain effective action. The response to treatment of the other strains tested was intermediate between that of the above two pairs of strains.

Rickettsiae could be recovered from the tissues of successfully treated mice, in one case up to 100 days after infection, although the treatment was continued throughout the whole period.

Mice infected with *R. akari* and *R. mooseri*, and guineapigs infected with *R. rickettsi*, responded well to the treatment, but contrary to what happened with *R. tsutsugamushi*, rickettsiae could not be recovered from the tissues of the animals. *R. rickettsi* did not respond as well as the others.

The drug had no rickettsiacidal action *in vitro* on *R. tsutsugamushi*.

Blood levels of the drug in mice, treated intraperitoneally, were tested at frequent intervals; the maximum level was reached in about half an hour and then fell rapidly, reaching negligible proportions within three or four hours.

Full details of the numerous experiments carried out by the authors will be found in the paper. *John W. D. Megaw*

PRATT, H. D., LANE, J. E. & HARMSTON, F. C. **New Locality Records for** *Allodermanyssus sanguineus*, **Vector of Rickettsialpox.** *J. Econom. Entom.* 1949, June, v. 42, No. 3, 414–15, 1 fig.

The findings were in named areas in Illinois and Utah.

GEAR, J. & HARINGTON, A. L. **Tick-Bite Fever: Two Cases treated with Aureomycin (Lederle), a New Antibiotic.** *South African Med. J.* 1949, June 25, v. 23, No. 26, 507–8, 2 figs.

Strikingly good results were obtained by aureomycin treatment in two cases of tick-bite fever, "the variety of tick typhus occurring in South Africa."

Treatment, by the mouth, was started on the 4th day in one case and on the 5th day in the other. In both cases there was rapid amelioration of the symptoms, fading of the rash, and a fall to normal of the temperature within two days.

One of the patients, aged 17, received a total quantity of 4·0 gm. given in doses of 250 mgm. every four hours; the other patient, aged 4½ years, received 2·25 gm. in doses of 250 mgm. in syrup thrice daily for three days.

The drug was given in doses considerably smaller than those employed by Ross *et al.*, in cases of Rocky Mountain spotted fever [see this *Bulletin*, 1949, v. 46, 350].

[The efficacy of small doses is an important point in view of reports of reactions, which though usually slight, apparently may in rare cases be severe or even fatal (see this *Bulletin*, 1949, v. 46, 725)]. *John W. D. Megaw*

LIPPELT, H. & CASELITZ, F. H. Zur Komplement-Bindung des Q-Fiebers. [**Complement Fixation in Q Fever.**] *Deut. med. Woch.* 1949, July 29, v. 74, Nos. 29/30, 918–19.

The authors describe the confirmation by complement-fixation tests of the diagnosis of Q fever as the cause of the laboratory outbreak which occurred at Hamburg in 1947–48 [see this *Bulletin*, 1949, v. 46, 626].

The antigen employed was the Italian (Henzerling) strain of *Rickettsia burneti*, obtained from the Bethesda, U.S.A., laboratory.

Apparently every person engaged in handling the strains isolated in the Hamburg laboratory became infected; the only one who appeared to have escaped still gave a positive reaction. *John W. D. Megaw*

KLOPSTOCK, A., KLOPSTOCK, E. & ROSENKRANZ, G. **The First Diagnosed Outbreak of Q-Fever in Israel.** *Harefuah.* Jerusalem. 1949, July 1, v. 37, No. 1. [In Hebrew 1–2. English summary 2.]

During this outbreak, positive complement-fixation tests with *R. burneti* (Italian strain) were obtained in 75 of 234 sera in titres of 1/32 to 1/2048. In four cases, four to 64 fold rises in titre occurred. In five, the reaction rose from negative to 1/128.

Most of the cases occurred in Haifa and were chiefly in males. There appeared to be no contact with cows or goats in most cases and "as the outbreak started in winter, ticks and other insects could be excluded as vectors." Dust from material handled in Haifa might account for the infection, but no source has yet been determined: the outbreak has been non-explosive and protracted over several months. Most of the negative sera were from cases of atypical pneumonia. *H. J. O'D. Burke-Gaffney*

WEGMANN, T. Encephalitis nach "Q fever." [**Encephalitis after Q Fever.**] *Schweiz. med. Woch.* 1949, July 30, v. 79, No. 30, 690–92, 1 fig. [15 refs.]

The first recorded case of encephalitis after Q fever is described. The onset was eight days after defervescence from a proved attack which lasted ten days. The first symptom was tremor of the right hand; soon there were diplopia, lassitude, inversion of the sleep period, diminished sensitiveness to touch over the right hand and arm, slurring speech, and exaggeration of knee jerks. The attack lasted about six weeks; recovery was complete.

The disease is believed to be similar to the encephalitis known to follow smallpox vaccination, measles, rubella, varicella, parotitis, influenza, and other virus diseases. The author inclines to the view that the condition is one of neuro-allergy associated with the antigen-antibody reaction.

John W. D. Megaw

KUHNS, D. M. La fiebre de Bullis como problema fronterizo. [**Bullis Fever as a Border Problem.**] *Bol. Oficina Sanitaria Panamericana.* 1949, July, v. 28, No. 7, 696–701, 1 map. English summary.

BARTONELLOSIS

CORRADETTI, A. Esperimento di prevenzione della verruga peruviana e della malaria nella valle del Rio Santa Eulalia (Perù). [**Experiment in Prevention of Verruga Peruviana and of Malaria in the St. Eulalia Valley, Peru.**] *Riv. di Parassit.* Rome. 1949, Mar., v. 10, No. 1, 53–8, 3 figs. English summary (4 lines).

In 1947 work was started on the construction of a new pipeline, to reinforce the hydro-electric power supply of the City of Lima, in the Valley of Santa Eulalia. The River Santa Eulalia flows south-west to join the River Rimac, at an altitude of 1,000 metres, 50 kilometres from Lima. Work was concentrated in the lower 20 kilometres of the Valley, up to a height of about 1,800 metres. Both verruga peruviana and malaria are notoriously prevalent in the Santa Eulalia Valley. The problem was to protect the labour force from infection by both these diseases; 3,185 persons were involved. The two disease vectors concerned were *Anopheles pseudopunctipennis* and *Phlebotomus verrucarum*.

In March and April all the dwellings, huts and animal houses in the area were sprayed internally with DDT, 2·5 gm. per square metre of surface treated. External walls that furnished a favourable habitat for phlebotomi were sprayed with a slightly higher concentration of DDT. In August the spraying of houses was repeated, 1·29 gm. per square metre.

Constant inspection failed to find *A. pseudopunctipennis* in the dwellings during this period and sandflies disappeared suddenly after the spraying. Protection from both diseases was complete. *Norman White*

YELLOW FEVER

KUMM, H. W. Estudos da febre amarela silvestre no Brasil durante os dez últimos anos. [**Studies on Jungle Yellow Fever in Brazil during the Past Ten Years.**] Reprinted from *Anais do VII Congresso Brasileiro de Higiene, reunido em São Paulo, de 12 a 19 de dezembro de 1948.* 9 pp., 4 maps. [32 refs.]

This paper was presented at the Seventh Brazilian Congress of Hygiene, São Paulo, 1948. In it the author sums up a large amount of work [most of which has been reviewed in this *Bulletin*] dating from about the time when SHANNON, WHITMAN and FRANCA isolated the virus from *Haemagogus capricorni*, *Aëdes leucocelaenus* and a group of Sabethine mosquitoes, all caught wild in the forest. In the region where these captures were made, *Haemagogus spegazzinii* is commoner than *H. capricorni*, and the importance of *H. spegazzinii* as a vector has been confirmed by LAEMMERT *et al.* [this *Bulletin*, 1947, v. 44, 414]. The two species, which at one time were regarded as the same, can be distinguished by the terminalia of the males, but this is not very helpful in field work [see also this *Bulletin*, 1945, v. 42, 609, footnote].

The author discusses the animal reservoir of yellow fever, and gives spot-maps showing the distribution of human cases (1939–48), the places where immune bodies have been detected in various genera of Primates, and the places where various species of *Haemagogus* and *Aëdes leucocelaenus* have been found. He notes that marking experiments have shown that *H. spegazzinii* and *Aëdes leucocelaenus* can fly 10 and 6 kilometres respectively from the point of liberation. *Charles Wilcocks*

RABIES

WILLIAMS, R. B. **Epizootic of Rabies in Interior Alaska 1945-47.** *Canadian J. Comp. Med.* 1949, June, v. 13, No. 6, 136–43, 1 map.

In the present article proof is adduced that rabies is widespread over interior Alaska and reached epizootic proportions during 1945–47. It emerges that the causative virus is firmly established in the territory's wildlife population and that rabies in the fox constitutes a major problem in control. Thus in Alaska the wild animals, especially the fox, are a reservoir of infection for dogs and other species, including man.

During the 1945–47 epizootic it was possible, by clinical and laboratory examination, to demonstrate the disease in 7 foxes, 3 dogs and 1 wolf. No deaths from rabies among human beings were recorded—a circumstance which may, apart from the obvious difficulty of collecting accurate information in such a territory, be explained by the availability of anti-rabies treatment and the heavier and the more protective nature of the wool and fur clothing worn in these latitudes. *G. Stuart*

VERLINDE, J. D. & KRET, A. **Failure to cultivate Rabies Virus in Vitro.** *Antonie van Leeuwenhoek : J. Microbiol. & Serol.* 1949, v. 15, No. 1, 34–6.

" Report of the unsuccessful cultivation of rabies fixed virus in a cell-free medium consisting of steamed sheep-brain extract, glycine, peptone and a number of accessory factors (tryptophan, aneurine, nicotinic acid amide, pyridoxine hydrochloride, sodium pantothenate and lactoflavin). After 24 and 48 hours' incubation at 37°C., under aerobic conditions, the virus had completely lost its virulence, and did not induce immunity to reinoculation with active virus."

KIRK, R. C. & ECKER, E. E. **Time of Appearance of Antibodies to Brain in the Human receiving Anti-Rabies Vaccine.** *Proc. Soc. Exper. Biol. & Med.* 1949, Apr., v. 70, No. 4, 734–7, 2 figs. [13 refs.]

For many years it has been known that a desseminated type of encephalomyelitis can be produced in experimental animals by the injection of either homologous or heterologous brain tissue and that the lesions found in this condition closely resemble those present in human demyelinating diseases, including the encephalomyelitis which follows anti-rabies treatment. Consequently the possibility has been suggested that iso-immunization to brain tissue may be the factor responsible for the production of these diseases and, in particular, of the encephalomyelitis occasionally observed to complicate the administration of anti-rabies vaccine, inasmuch as in the latter the injection of heterologous brain tissue parallels in many respects the experimental procedure followed with the experimental animals.

It seemed of interest to the authors, therefore, to ascertain in a preliminary study of five bitten persons treated with Semple's phenol-killed rabbit brain virus vaccine whether or not such treatment did in fact lead to the development of anti-brain antibodies in the patients' sera. To this end antigens prepared from the white matter of fresh human brain were employed for : (1) the immunization of rabbits to determine the antigenicity of the brain extract used and (2) the titration of the sera of the five patients receiving the anti-rabies vaccine. As regards (1) : results confirmed that antibodies to brain tissue are produced in the rabbit by the intravenous injection of foreign brain substance. As regards (2) : the findings may be summarized as follows :—

In three patients, to whom the routine 14 daily injections had been given, the sera showed a negative complement-fixation reaction until the 15th to 18th day, when antibodies to the brain antigen made their appearance. In the fourth patient who, without personal history of allergy, had been compelled on account of excessive local reactions to discontinue treatment after the fifth injection, a condition necessitating admission to hospital and diagnosed provisionally as "possible encephalitis following anti-rabies treatment" developed six days after the first injection and continued until his recovery and discharge from hospital 14 days later. In this case samples of sera, obtained on the 9th and 12th day after the beginning of symptoms, showed a high titre of complement fixation when compared with the sera taken from the other cases investigated. In the fifth patient no anti-brain antibodies occurring after treatment with anti-rabies vaccine were at any time demonstrable.

Results of the authors' present investigation adduce evidence that antibodies to human brain are produced in patients receiving the Semple anti-rabies vaccine. The fourth case suggests the possibility that a markedly increased anti-brain antibody titre may occur in those patients who develop an encephalitis after this treatment. *G. Stuart*

PLAGUE

P'An, H. S., Tchan, Y. T. & Pochon, J. Etude cytologique de *Pasteurella pestis* soumis à l'influence du bactériophage spécifique. I. Modifications morphologiques de l'appareil nucléaire. [**A Cytological Study of the Effect of Specific Bacteriophage on *Past. pestis*. I. Morphological Changes in the Nuclear Apparatus.**] *Ann. Inst. Pasteur.* 1949, May, v. 76, No. 5, 468–70, 4 figs.

The authors had previously demonstrated the presence of nuclear material in *Past. pestis* by the technique of Robinow. They described two nuclear granules in each resting cell, which fused to form a single dumb-bell-shaped structure during the process of bacterial division. Fragmentation of this structure into four chromatin granules preceded protoplasmic fission, so that each daughter cell had two nuclear granules as in the original resting cell.

In organisms exposed to the action of a specific phage, the normal process of nuclear division did not take place. Both the bacterial bodies and the nuclear material showed marked swelling. The two nuclear granules fused together to form thick chromatin rods which became elongated and filamentous with further increase in size of the bacterial body. After four to five hours' exposure to phage action, the nuclear material gradually became indistinguishable with the final disruption of the organism. The authors contrast this sequence of events with that seen in susceptible organisms exposed to the action of penicillin, in which nuclear division was unimpaired but fission did not take place, so that giant bacterial forms with multiple nuclei were eventually seen. *B. Moore*

CHOLERA

Kamal, A. M., with G. A. Messih & Z. Kolta. **Experiences in the Recent Cholera Epidemic in Egypt.** Reprinted from *J. Egyptian Pub. Health Ass.* 1948, 185–96, 3 charts (1 folding). [13 refs.]

This paper presents the personal conclusions of the authors on the observations made during the outbreak of cholera in Egypt, most of which have already been published.

GHANEM, M. H. & MIKHAIL, M. N. **Clinical and Biochemical Studies in Cholera and the Rationale of Treatment.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1949, July, v. 43, No. 1, 81–96. [14 refs.]

In discussing the clinical and biochemical observations made on cases of cholera during the Egyptian epidemic of 1947 the author presents his findings on the losses incurred and the deductions made as to the suitable methods of treatment for their rectification. The findings are, in general, in accordance with usual experience.

Dehydration.—Clinical severity was found to be in direct proportion to clinical dehydration and to the number of evacuations that had occurred. It was related to both water and electrolyte loss and not to either alone. The water loss is considered to be more important as no special clinical manifestations could be ascribed to salt depletion alone. The author considers that the use of isotonic rather than hypertonic saline for transfusion is indicated. The specific gravity of the plasma is the best single indicator of the degree of dehydration and a guide to calculating the amount of fluid needed for correction.

Blood and urine chlorides.—Blood chloride was found to be raised in all cases. In 16 cases the figure ranged from 520 to 710 mgm. per cent. The higher figures were associated with a severer grade of dehydration and indicated the necessity for energetic treatment.

It was considered, however, that the estimation of plasma chlorides is fallacious as an indicator of the total loss of chlorides because of the tendency to hypertonicity in the diminished extracellular fluid. Urine chlorides were low in all cases on admission and, taking into account the small amount of urine passed, the total excretion indicated marked salt depletion. No correlation was found between urine and blood chlorides ; the urine chloride levels form a better measure of the total chloride loss and a guide to salt therapy.

Potassium loss.—Disturbance of electrolyte balance occurs in cholera and a diminution of blood potassium was found in the majority of cases examined. This did not bear any relationship to clinical severity and no special clinical manifestations were attributed to it. It is suggested that the lower levels found may have been due to loss in the excreta in the absence of intake ; investigations on the point are indicated.

Plasma proteins.—About two-thirds of the cases examined showed hyperproteinaemia and one-third showed hypoproteinaemia. The differences are attributed to the balance of the factors of blood concentration and protein loss. Possible factors producing protein loss are discussed. The author considers that cases showing hypoproteinaemia should be given plasma transfusion and that the indication for this would be the figure of the specific gravity of the plasma. [Other workers in Egypt have considered that plasma transfusion is contraindicated in cholera.]

Azotaemia.—" Azotaemia was demonstrated in two-thirds of the cases studied ; it has no relation to clinical severity, it disappeared in all but three cases under treatment. Although it is mainly related to dehydration and circulatory failure, it has no relation to the degree of blood concentration, or hypochloraemia. A renal factor of toxic nature in the production of azotaemia is suggested by the present work."

The mechanism, effects and prognostic significance of anuria, and the importance of its rapid correction are discussed.

Treatment.—Detailed recommendations for treatment are presented. Isotonic solution, or preferably Ringer's solution, is advised for transfusion to begin with, until urine chlorides reach 5 grammes per litre or more and, after that, the same solution made hypotonic by the addition of an equal amount of 5 per cent. glucose solution. The use of sodium lactate is recommended for

correction of acidosis. It may be added to the Ringer's solution and administration continued until the reaction of the urine becomes neutral or slightly alkaline. Sulphaguanidine is considered to be the most suitable drug to use in treatment because of its local effect with little absorption.

John Taylor

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

D'ANTONI, J. S. **The Pattern of the Literature of Amebiasis : 1932–1947. A Commentary on Trends.** *Amer. J. Trop. Med.* 1949, May, v. 29, No. 3, 269–93, 15 figs. [34 refs.]

This is the presidential address presented at the 44th annual meeting of the American Society of Tropical Medicine. Amoebiasis has been recognized as a clinical entity since 1875 when LOSCH identified *Entamoeba histolytica*, though he failed to realize its causal effect in amoebic dysentery. American interest was first aroused by COUNCILMAN and LA FLEUR's report of 14 cases of amoebic dysentery at Johns Hopkins Hospital in 1891 ; it was renewed by the epidemic of amoebic dysentery in Chicago in 1933. The author has collated quantitatively the literature on amoebiasis published during the period under review, and shows graphically under various headings its proportionate origin from various areas of the world. He considers it regrettable that after the temporary excitement and general interest aroused in the profession in America by the Chicago outbreak the subject of amoebiasis has since received inadequate attention in the non-specialist medical journals—evidence of a lack of interest in it by the profession due to ignorance of its importance. After a review of the literature on the Chicago outbreak there follows a broader review of the literature on the incidence, the clinical manifestations, and the treatment of amoebiasis. That on amoebic liver abscess and its complications, on amoebiasis in children, and on the military aspects of the condition receive attention, and the very scanty expressions of opinion on the insurance risk attaching to the infection are considered. "The curious case of dr. O. Ublavici" elucidated by DOBELL (*Parasitology*, 1938, v. 30, 239), is recalled in broad detail.

The author concludes his address by redirecting attention to the importance of amoebiasis as a condition widespread in the temperate zones as well as in the tropics, and the ignorance of general physicians of the subject. Amoebiasis constitutes an important public health problem the solution of which lies neither in the impossible task of routine examination of food handlers and isolation of infected persons, nor in sensational articles in the medical Press. Its solution must be sought in properly controlled research, particularly into matters of diagnosis and of treatment, and in education of the general body of the medical profession before attempts are made to instruct the general public.

A. R. D. Adams

CHANG, Shih L. **Some Epidemiological and Biological Problems in Water-borne Amoebiasis.** Reprinted from *Limnological Aspects of Water Supply and Waste Disposal, Amer. Ass. for the Advancement of Science.* 1949, pp. 16–32. [49 refs.] [Publications from Graduate School of Engineering No. 464. Harvard University. 1948–49.]

Interest in water-borne amoebic dysentery was aroused in North America after the Chicago outbreak in 1933. The epidemic showed that severe clinical

amoebiasis may occur in epidemic form even in the temperate zone. It may also be pointed out that carrier rates are high in the Northern States such as Minnesota and Pennsylvania and constitute a potential source of danger even in the temperate zone. On the other hand some epidemiologists have not yet fully accepted the view that amoebiasis is water-borne and consider that the Chicago epidemic was so unusual that it should be considered as an exception rather than the rule.

Observations show that many people may be infected with *E. histolytica* and yet show no symptoms and have no history of dysentery. It has therefore been suggested recently that the Chicago epidemic might have been an outbreak of bacillary dysentery among a population with a high carrier rate of *E. histolytica.*

Clinically the cases of amoebic dysentery may be divided into two groups: primary and secondary dysentery. The primary cases are those that develop dysentery after the direct ingestion of infective material. The secondary cases are those that have been carriers for months or even years and develop amoebic dysentery upon the introduction of certain secondary factors.

The incubation period of the naturally infected cases may be as short as nine days but in the secondary cases the period is difficult to assess. The analysis of 216 selected cases from the Chicago epidemic gave the following incubation periods :—

less than 11 days	25 per cent.
between 12 and 20 days	25 ,, ,,
between 21 and 36 days	25 ,, ,,
between 37 and 120 days	25 ,, ,,

On account of the relatively long incubation period in the majority of cases, the extent of the epidemic was not realized during the outbreak because there were only 15 cases which were connected with the two hotels involved and reported to the Chicago Board of Health. The size of the epidemic was only disclosed by the questionary survey made later.

Amoebic cysts may survive in water or sewage for a few days to almost three months depending on the temperature of the suspending medium. The cysts are only slightly heavier than water so that one cannot depend on storage of water or sewage for removal of cysts unless a long period is allowed for sedimentation. Perhaps one of the best methods of removing amoebic cysts is by flocculation and filtration through pressure filters, 99 per cent. being removed. If chlorination is the only method available for the destruction of cysts in water, then superchlorination or breakpoint chlorination must be employed.

"For emergency treatment of water to destroy cysts, superchlorination at pH 5·0 to 6·0 followed by dechlorination or treatment with elemental iodine to give a residual of about 4 to 5 ppm in 10 minutes at pH 5·0–7·0 would be satisfactory." *E. Windle Taylor*

CODELEONCINI, E. Studio statistico sulle parassitosi intestinali nello Scioa. [**Intestinal Parasitism in Scioa.**] *Acta Med. Italica.* 1949, July, v. 4, No. 7, 174–8, 1 chart. English summary (2 lines).

In Addis Ababa the Imperial Ethiopian Medical Research Institute has a good laboratory under Professor Giaquinto. In this paper the author reports on the results of the examination of 7,870 samples of faeces in the six years July 1941–June 1947 inclusive. The samples were "the second or third results examined in a fresh state after a saline purgative." Of the total, 4,732 (60·1 per cent.) were positive for some parasite or other; 424 were positive among 1,607 samples from Europeans (26·3 per cent.) and 4,308 among 6,263

Ethiopians (68·7). The parasite most commonly found was *Entamoeba histolytica* (1,611) ; *E. coli* was next (1,243) ; *Chilomastix mesnili* came third, but a long way behind (357), and then, in order, *Trichomonas* (288), *Trichuris* (280) [mentioned as *Trichocephalus*, but further down in the same list is *Trichuris trichiura* 77], *Giardia* (260) ; of the cestodes *Taenia saginata* was found in 191, but *T. solium* once only and that in a European ; *Ascaris lumbricoides* was not common (136) and *Ancylostoma* in 97 only. *Schistosoma* [species not mentioned] was seen once only, in an Egyptian immigrant. *H. Harold Scott*

MONTERO, E. & URIBE, V. Correlación endoscopica, parasitologica y serologica en el diagnostico de la amebiasis. (Comunicación preliminar.) [**Correlation of Endoscopy and Parasitological and Serological Examinations in the Diagnosis of Amoebic Infection.**] *Rev. Med. Chile.* 1949, Mar., v. 77, No. 3, 143–8. [38 refs.]

In more than 70 per cent. of fatal cases of amoebic dysentery lesions are found in the rectum and sigmoid, and MANSON-BAHR has shown that in 90 per cent. of 258 patients with parasitological evidence of intestinal amoebiasis such lesions are visible by endoscopy [this *Bulletin*, 1942, v. 39, 29] ; thus, in 10 per cent. (some authors give a much higher figure), in spite of the infection, no local lesions are found by endoscopy, the higher levels of the colon or the caecum being attacked. There is no need to stress the frequency with which the *Entamoeba* is not found by direct faecal examination. The results of complement fixation tests vary greatly in the hands of different authors and according to the nature of the antigen used.

In the present investigation, the authors have carried out all three methods in 70 patients : 17 with acute amoebic dysentery, 27 with chronic intestinal amoebiasis, but no dysentery, 10 with amoebic hepatitis or liver abscess, and 16 with non-amoebic conditions as controls, among them 3 normal subjects, 5 with ulcerative colitis and 4 with chronic diarrhoea. The lesions as seen by endoscopy the authors divide into three grades : I. Small crateriform depressions, 1–3 mm. in diameter and in groups, seen by oblique illumination ; II. Superficial erosions, 3–5 mm. in diameter, with slight bleeding ; III. Typical ulcers and submucous abscesses. The parasitological examination was made of material taken with a pipette and examined at once fresh or in iodine solution, or, if the material was sufficient, concentrated by the centrifugation-floatation method with sulphate of zinc [this *Bulletin*, 1939, v. 36, 144; 1940, v. 37, 62]. Complement fixation was carried out with the Bozecevich, Hoyem and Walston technique as modified by REES *et al.* [this *Bulletin*, 1943, v. 40, 456].

The results are very interesting and instructive. Of the 17 with acute amoebic dysentery endoscopy showed 5 of grade II and 12 of grade III ; 13 were positive by direct examination for protozoa ; 13 gave a positive complement fixation. Of the 27 with chronic amoebiasis, by endoscopy 17 were grade I, 9 grade II and 1 grade III ; 9 only showed protozoa by direct examination and only 2 gave a positive fixation of complement. Next, the 10 with amoebic hepatitis : endoscopy showed 4 grade I, 2 grade II and 1 grade III, the other 3 showed no local lesion in the rectum or sigmoid ; 5 were positive parasitologically and 8 gave a positive complement fixation. Of the 16 controls none was positive either parasitologically or by complement fixation tests.

Endoscopic examination thus proved the best, especially for chronic cases without dysentery, while complement fixation was of special value in hepatic conditions secondary to amoebiasis of the intestine, where the sigmoidoscope reveals no lesions. *H. Harold Scott*

MARQUES, R. J. Em tôrno da sintomatologia da amebíase crônica. [**On the Symptomatology of Chronic Amoebiasis.**] *Med. Cirurg. Farmacia.* Rio de Janeiro. 1949, Feb.–Mar., Nos. 154/155, 101–8. [16 refs.]

Now that infection with *Entamoeba histolytica* is no longer almost exclusively tropical, this paper is very salutary for those practising in non-tropical countries and where those who have lived in the tropics have settled elsewhere. The author shows, with illustrative cases, that symptoms of a somewhat vague character, such as headache, general pains, loss of appetite, general weakness and "nervousness", palpitation, formication, backache, giddiness, cold and sweaty hands, irritability, "liverishness" and many others may be due to, at all events associated with, *E. histolytica* infection, and clear up when the infection is specifically treated. To some among the patients mentioned vitamins, liver extract and all sorts of nostrums had been given; one had had his appendix removed without benefit. [There is much to be said in favour of the routine examination of the faeces of any patient who gives a history of residence abroad, whatever his symptoms, and the laugh is not always on the side of those who taunt the tropical practitioner with being one of those "Who never his fee sees, Until he sees faeces".] *H. Harold Scott*

TURNBULL, G. C. & COOLEY, J. C. **The Clinical Significance of a High Right Diaphragm in the Diagnosis of Amebiasis and Amebic Hepatitis.** *Med. Times.* New York. 1949, Aug., v. 77, No. 8, 343–7, 1 fig.

This paper contains nothing original, but its purpose is to direct attention to the fact that in [some] cases of amoebic hepatitis and amoebic liver abscess the right cupola of the diaphragm is raised [and, it might be added, fixed]. After appropriate specific treatment it becomes progressively less so. Five illustrative cases are cited. [It is stated that amoebic liver involvement "is usually secondary to intestinal amoebiasis", but surely it is always so; again, in the report of case 5, biopsy of a rectal stricture yielded "*Endamoeba histolytica* cysts in the tissues," a most improbable finding.]

A. R. D. Adams

ARMSTRONG, W. **A Case of Cutaneous Amoebiasis.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1949, July, v. 43, No. 1, 79–80, 1 fig.

The author has seen two cutaneous lesions in the New Hebrides which appeared to be due to amoebiasis (presumably *E. histolytica*) and one of these is described and illustrated by a photograph.

The patient came to hospital in 1947 with a coarse, discharging, papillomatous type of fungating mass on the sacrum. This had been present for about three years, without treatment. The discharge was rich in amoebae.

Emetine, 1 grain daily, and a local dressing of 1 per cent. carbarsone solution caused the discharge to cease within three or four days after which the carbarsone dressings were replaced by a paint of salicylic acid in tinct. benz. co. Emetine was continued for ten days. The paint was little effective in reducing the warty mass, but glacial acetic acid rapidly cleared the area. There had been no recurrence by May, 1948. *H. J. O'D. Burke-Gaffney*

SWARTZWELDER, J. C. & MCGILL, H. C., Jr. **Intestinal Amebiasis complicated by Abscess of the Brain. Report of a Case without Hepatic or Pulmonary Involvement.** *Rev. Kuba Med. Trop. y Parasit.* 1949, Mar.–Apr., v. 5, Nos. 3/4, 27–9, 2 figs. [10 refs.]

"*Endamoeba histolytica* trophozoites were cultured from brain abscess material obtained at autopsy from a 45 year old male with amebic colitis.

A remarkable feature was the absence of amebic lesions of the liver and the lung. This case represents the fifth in a series of brain abscess of amebic etiology without involvement of the liver and the lungs."

RAWKINS, M. D. & KONSTAM, G. L. S. **Complete Heart-Block associated with Amoebic Hepatitis. Normal Rhythm restored with Emetine.** *Lancet.* 1949, July 23, 152–3, 5 figs.

Heart block in association with amoebiasis is a rarity ; only three references to it have been found in the literature of the last 20 years. In these cases auriculo-ventricular dissociation occurred during periods of acute dysentery ; the heart condition in two of them improved as a result of emetine treatment but the third patient, a child of five suffering from malnutrition, died. The present record is of a returned British officer, aged 28, who had suffered periodic diarrhoea since service in the Western Desert six years previously. He complained of attacks of giddiness and faintness of brief duration which recurred several times daily ; during these the heart seemed to miss beats, and there was lower sternal discomfort and pain in the shoulders. The patient was in quite good condition ; the pulse rate was 40 and regular, it rose to 60 on exercise ; the liver dullness extended to the fourth space in the mid-axillary line. Screening showed the right dome of the diaphragm to be raised and fixed ; its outline was blurred, and there was mottling of the base of the right lung, and this extended to the right root region. The condition was considered to be an amoebic hepatitis with inflammatory changes in the neighbouring lung, though no parasites were found on repeated stool examination, sigmoidoscopy revealed no abnormality, the leucocyte count was 8,000 per cmm. [and there was no pyrexia].

Frequent daily Stokes-Adams attacks occurred, with asystole for three to four seconds ; a cardiogram showed complete heart-block, with an auricular rate of 88 and ventricular of 31 per minute ; the ventricular rate was slightly irregular. X-rays showed the transverse diameter of the heart to be increased both to the left and to the right ; the left auricle was not enlarged.

Daily intramuscular injections of 1 grain of emetine caused the chest pain to disappear and the pulse rate to rise to 80 by the third day, but there were still extra systoles at every third or fourth beat. The heart-block and the Stokes-Adams attacks ceased after the third day of emetine treatment. On completion of the course of emetine (11 grains) the rhythm was normal and the sinus rate 40, with P-R interval 0·2 seconds. By this time there was free movement of the diaphragm, which was normal in level and contour, the heart was more vertical and its contour normal. A cardiogram one month after beginning treatment showed sinus bradycardia with a rate of 45 ; the P-R interval was 0·24 second. In another three weeks the sinus rate was 70, with a normal rhythm and a P-R interval of 0·2 second ; there were no extra-systoles. The heart-block in this case the authors think possibly to have been due either to toxaemia or to a metastatic amoebic infection ; in view of the rapid response to specific treatment they favour the latter explanation.

A. R. D. Adams

PARMER, L. G. & COTTRILL, C. W. **Distribution of Emetine in Tissues.** *J. Lab. & Clin. Med.* 1949, June, v. 34, No. 6, 818–21.

This report deals with the distribution of emetine in the tissues of rabbits after single intramuscular injection of 6 mgm. per kilo. of the hydrochloride in aqueous solution. Fifty-seven animals were used and were killed at intervals of from half an hour to 64 days after injection, for determination of the amount of alkaloid present in various organs. Similar determinations have recently been made by GIMBLE *et al.* [this *Bulletin*, 1949, v. 46, 467]. The method of estimation employed was based on that of BRODIE *et al.* [this *Bulletin*,

1947, v. 44, 793] which depends on the fact that a salt of methyl orange is formed by organic bases. Half an hour after dosage the concentration of the alkaloid was highest in lung, kidney and spleen, was much lower in heart and liver, while in the large intestine and brain the amounts present were very small indeed. It had been suggested previously that the difference in effect of emetine in hepatic and intestinal amoebiasis was due to the differences in concentration of drug in the various organs [PARMER, this *Bulletin*, 1948, v. 45, 1004], but this view does not seem to be borne out by the present results. The maximum concentration of emetine was generally reached in tissues within 24 hours of administration and after a further similar period the level declined. Some organs were free of emetine within two weeks, in others it persisted a little longer and was detectable for some further weeks in the spleen. Although the concentration in contractile tissues was low these organs appear to be most affected by the drug, and it is suggested that their metabolism of glycogen is interfered with. It is still not clear how the drug exerts its effect on *E. histolytica*. *J. D. Fulton*

THOMPSON, P. E. & LILLIGREN, Betty L. **Chemotherapy of Experimental *Endamoeba histolytica* Infection in Dogs.** *Amer. J. Trop. Med.* 1949, May, v. 29, No. 3, 323–36, 3 figs. [25 refs.]

The need for a suitable host in chemotherapeutic studies of experimental amoebiasis is still apparent. The present authors used dogs aged 6 to 12 months, after examination to exclude natural amoebic infections (which were not found) and after treatment with tetrachlorethylene to free them from helminthic infections. The animals were kept in individual cages on an essentially fish diet which was regarded as of importance in maintaining an acute or subacute infection [see FAUST *et al.*, this *Bulletin*, 1935, v. 32, 777]. They were readily susceptible to infections with *E. histolytica* maintained in culture or passaged from dog to dog by means of a rectal catheter which extended as far as the ileo-caecal valve and the mortality among infected animals was low. Several million amoebae were given in each inoculum. To obtain faecal samples for examination colonic irrigation was employed. Since only 31 animals were used for evaluating 10 compounds the numbers in each group were necessarily small; sometimes only one dog was used. The authors, in spite of some obvious disadvantages of such a large host as the dog, consider that animal to be suitable for chemotherapeutic tests because it can readily be infected and acquires an acute or subacute infection lasting for several months with resultant colitis and shallow ulceration without infection of other organs. From the results of treatment with emetine, carbarsone, chiniofon and diodoquin the correlation between the responses obtained in canine and human amoebiasis was considered satisfactory. The three latter were curative but not emetine, camoquin or chloroquine (both the latter being 4-aminoquinolines). [Chloroquine has recently been reported as effective in human amoebiasis; see CONAN, this *Bulletin*, 1948, v. 45, 430; also MANSON-BAHR, *ibid.*, 1949, v. 46, 744.] Antibacterial agents including penicillin, streptomycin, sulphadiazine and succinylsulphathiazole proved ineffective in treatment, and this fact suggested that the amoebae rather than the bacteria present were responsible for the lesions encountered. *J. D. Fulton*

BASNUEVO, J. G. & GUTIÉRREZ ESTARLÍ, E. Absceso hepático amibiano curado con cloroquina. [**Amoebic Abscess of the Liver cured by Chloroquine.**] *Rev. Kuba Med. Trop. y Parasit.* 1949, Mar.–Apr., v. 5, Nos. 3/4, 31–7, 5 figs. [31 refs.] English summary.

A very interesting case of hepatic abscess is reported in detail in a boy of 17. The physical signs were apparently typical, but an exploratory puncture

yielded greenish-yellow pus in which no trophozoites of *E. histolytica* could be demonstrated. The faeces were also negative and there was only a slight leucocytosis (9,800 per cmm.).

During the course of open operation thick yellow gelatinous pus was revealed in which also no *E. histolytica* individuals could be seen, though, on culture, staphylococci and streptococci were isolated. From the seventh day after the operation increasingly numerous active amoebae (of which figures are given) were seen moving about in the pus. During this interval the patient had been under continuous treatment with streptomycin as well as penicillin. On the eleventh day this treatment was discontinued and chloroquine diphosphate (Tanakán) by mouth instituted (12·5 gm. in 26 days) without the supervention of any toxic symptoms. Five days after chloroquine treatment was started the amoebae had disappeared from the pus. On the fourteenth day of the chloroquine course the operation wound had healed satisfactorily. The condition of the patient was excellent and he had put on 31 lb. in weight in 2½ months after the operation date. It is therefore concluded that chloroquine cures hepatic amoebiasis. It is clearly stated that no emetine was administered.

In a footnote, Tanakán is stated to be " chloroquine quinoline diphosphate ", each tablet containing 0·25 gm. which is equivalent to 0·155 gm. of the base. It also contains starch (0·07 gm.) and colloidal Kaolin (0·45 gm.)

[For other references to this treatment of amoebic abscess, see this *Bulletin*, 1949, v. 46, 744.] *P. Manson-Bahr*

i. ALAIN, M., MASSAL, E., TOUZIN, R. & PORTE, L. Le traitement de l'amibiase par la Conessine. Résultats d'une experimentation faite à l'hôpital Michel-Levy, Hôpital d'Instruction de l'Ecole d'Application du Service de Santé des Troupes Coloniales. [**Treatment of Amoebiasis with Conessine. Results of Trials at the Michel-Levy Hospital, Marseilles.**] *Méd. Trop.* Marseilles. 1949, Jan.–Feb., v. 9, No. 1, 5–38, 3 charts.

ii. SOULAGE, J. Expérimentation de la " Conessine " (Roquessine). Compte-rendu de l'essai thérapeutique effectue au Centre Médical des F.T.E.O. (Hôpital Grall-Saigon). [**Trials with Conessine (Roquessine) at the Medical Centre, Saigon.**] *Ibid.* 39–97, 9 charts & 10 figs.

iii. SIGUIER, F., PIETTE, M. & CROSNIER, J. Etude expérimentale comparative de la Conessine et de l'Emétine. [**Experimental Comparison between Conessine and Emetine.**] *Ibid.* 99–109, 2 figs.

The first number of the ninth volume of *Médecine Tropicale* is devoted to three reports on the use of conessine in the treatment of amoebiasis, and to an extensive bibliography on the drug. Since the French workers at Dakar [this *Bulletin*, 1948, v. 45, 905] redirected attention to the therapeutic efficiency in the treatment of amoebiasis of the alkaloids of *Holarrhena africana*, and in particular of conessine, several other French workers have reported most favourably on it [this *Bulletin*, 1948, v. 45, 1086 ; 1949, v. 46, 365, 469]. The first two of the three papers summarized below consist of reports on the treatment of patients suffering from various forms of amoebiasis, in France and in Cochin China, with " Roquessine ", a proprietary preparation of conessine hydrochloride put up in cachets each containing 0·1 gm. of the compound for oral administration. The third paper contains an account of the action of conessine *in vitro* as compared with that of emetine ; there are some studies on its excretion in the faeces and the urine, and its relative concentrations in the fluid and cellular contents of the blood have been estimated. In an appendix there are lists of references in the literature, arranged in chronological sequence, to the plant and its derivatives.

These papers contain much detail which it is impossible to summarize; they should be consulted in the original by those interested.

i. Of forty patients suffering from amoebiasis, contracted chiefly in Indo-China, thirty-eight withstood a full course of treatment with conessine at the Michel-Lévy military hospital at Marseilles during 1948. Two other patients began the drug, which had to be stopped on account of the development of serious toxic manifestations. The findings and progress in each case are recorded in detail. Most of these persons had previously had repeated treatments with the accepted drugs; many of them were suffering from a chronic dysentery which proved refractory to the usual therapy.

With the use of Blanc's classification, the cases completing treatment could be relegated to one of the following clinical types of amoebiasis:—

Type 1.—Acute intestinal relapse (6 patients);

Type 2.—Chronic intestinal amoebiasis:

(*a*) with diarrhoea (6 patients);

(*b*) with alternating diarrhoea and constipation (3 patients);

Type 3.—True chronic amoebic dysentery (18 patients);

Type 4.—Hepatic amoebiasis (5 patients).

Type 1 *cases* (6) were given at least 4 gm. of "Roquessine" orally over a period of ten days. Acute symptoms usually subsided by the second or third days of treatment, the stools became formed by the fourth, and amoebae disappeared concurrently. "Cysts" are also said to have vanished, but subsequently reappeared intermittently. Sigmoidoscopy showed healing of ulceration in two of the cases, and substantial diminution in ulceration in another three; in all the general physical condition rapidly improved.

Type 2 (*a*) *cases* (6), in which emetine is stated to be of little value, showed an equally rapid response to conessine in doses of 4·8 gm. and upwards over 13 or more days. Relapses, however, subsequently occurred.

[From one of the six patients listed no amoebae or cysts were recovered to substantiate the diagnosis, which was based on a past history of dysentery. This patient had ascariasis, and did not benefit from treatment with santonin or chenopodium, or with sulphaguanidine, emetine, or conessine.]

Type 2 (*b*) *cases* (3) also rapidly improved with conessine treatment, but "colonic dysfunction" continued, as in the preceding type.

[From one of the three patients listed no parasites other than *Giardia* were recovered; another was passing "cysts" only, in spite of the evacuation of five to six loose motions each 24 hours.]

Type 3 *cases* (18), all of whom had been suffering from continuous acute dysentery, had previously failed to benefit from the classical treatments including emetine, penicillin and sulphaguanidine. In all of them symptoms vanished during the second day of treatment; the stools from 12 of them were formed by the sixth day, but in three others they were occasionally loose, and in the remaining three they continued constantly so. Amoebae had disappeared from the stools by the fourth day, but in five cases later recurred. In seven cases cysts appeared transitorily about the 10th to 12th day, and these, from their appearance, were thought to be non-viable; they then vanished from the stools. Ulceration of the bowel showed healing by the 30th day in nine patients; in four others, additional conessine treatment eventually produced healing, but in the remaining case examined by sigmoidoscope the ulceration persisted. Abdominal physical signs had vanished after treatment in four cases, diminished in ten, but persisted in the remaining four. The general health and condition in all was restored in such a striking manner as to suggest a "resurrection" in some of them. In three of four cases where diarrhoea recurred

soon after treatment a second course of conessine after a couple of months produced the desired effect, but the fourth patient required a third course of conessine to achieve this.

Type 4 *cases* (5) with pre-suppurative hepatitis or, in one case, recrudescence after drainage of a liver abscess with extension to the right lung, all responded in a " spectucular " manner to conessine treatment and symptoms and signs vanished.

After detailing the clinical response of the various types of amoebiasis to conessine treatment the authors turn their attention to the optimum dosage, and to the toxic manifestations produced by the drug. The pharmacology of conessine has already been examined by English and Indian workers, and more recently it has been re-examined by the French workers, in particular at Dakar [see this *Bulletin*, 1948, v. 45, 905, 1086 ; 1949, v. 46, 365, 469]. The authors gave five doses each of 0·1 gm. of conessine hydrochloride in cachets (" Roquessine ") daily for five days, and immediately followed this by three doses of 0·1 gm. daily until the necessary total dosage was reached. This total ranged from 2·5 gm. to 6·1 gm. in different cases ; the average was 4 gm. for a case of acute intestinal relapse, 4·8 gm. for a case of chronic intestinal amoebiasis with diarrhoea, 4·1 gm. for a similar case with alternating diarrhoea and constipation, 5·0 gm. for one of true chronic amoebic dysentery, and 4·6 gm. for one of hepatic amoebiasis. Five patients underwent a second course of treatment between 30 and 113 days of completion of the first course ; and one patient had three courses of conessine treatment, totalling 14·5 gm. of the drug, in 112 days. Tests of the urine with Tanret's reagent showed that the excretion of the drug varied in a manner unrelated to the daily or to the total dosage of the drug.

" Roquessine " by the mouth caused no intestinal upset of significance, but gave rise to a bitter taste in the mouth ; it commonly led to difficulty in getting to sleep, and nightmares. In some cases motor and psychic disturbances developed, and in two instances these were serious and in one of these mania developed which required prolonged shock treatment ; this patient had a psychopathic personal and family history. Buzzing in the ears, giddiness, and temporal headache were encountered, and these often were associated with tremors of the extremities, and of the tongue ; these did not interfere with normal activities and disappeared during complete relaxation. Persons of unstable psychological make-up suffered most from these troubles, and Gardenal at bedtime usually, but not invariably, resolved them ; they were most evident early in treatment, and in any event spontaneously vanished a few days after its completion. The blood pressure was not affected by conessine, but in about half the cases treated there was some change in the red cell count and haemoglobin content of the blood. In four instances the values for these were raised, in seven reduced (in three markedly so), but no abnormal red cells were seen ; liver therapy rapidly restored the counts to normal. Minor variations were observed in the total leucocyte counts and differential counts, but no abnormal white cells were seen.

The authors conclude that conessine is an excellent specific therapeutic remedy in all forms of amoebiasis, and it produces remarkable relief of the manifestations directly attributable to the parasite but, like other amoebicidal drugs, it fails to correct the sequelae of intestinal amoebiasis, in particular colonic dysfunction.

ii. During July 1948 in Saigon, Cochin China, 135 patients of whom 129 were Europeans, were treated with " Roquessine " ; 105 others were similarly treated during August and September. These patients included sufferers from amoebiasis in all its forms. Kurchi bismuth iodide [a preparation of Holarrhena, also known as Kurchi] in 5-grain tablets had become available in

Indo-China after 1946; the dosage then advocated was 10 grains, but this dosage is inadequate to control acute attacks of amoebic dysentery and so the initial trials of Kurchi bark were of little value. Conessine at first was given to a total of 0·1 gm. per kgm. of body weight up to a maximum of 5 gm.; the daily dosage did not exceed 0·5 gm. (0·01 gm. per kgm.), which amounted in practice to 0·1 gm. five times a day, at intervals of three hours, for persons of 50 kgm. or more. Alternatively, the recommendations of the Dakar workers (this *Bulletin*, 1948, v. 45, 905) were followed—0·5 gm. daily for four days, a four or five day break, and then 0·3 gm. daily to a total of 4·5 to 5 gm. Finally, a daily dosage of 0·4 or 0·5 gm. for four or five days, according to the bulk of the patient and the gravity of his condition, was adopted; this was followed immediately by 0·3 gm. daily to a total of 4 gm., 4·5 gm., or 5 gm. for those of 50 kgm. and over. Dosage for those below this weight was estimated on the basis of a total dosage of 0·1 gm. per kgm., with a daily dosage of 0·01 gm. per kgm.

The first of these treatments tended rapidly to produce intolerance to the drug which, when allowed to develop, interfered with the treatment; and the second permitted of clinical relapse during the intermission. With the third course, that finally adopted, Gardenal 0·1 gm. was given in the evenings and this was continued for eight days after completion of the course. Where this was found inadequate to control side effects it was increased to 0·15 gm. and 15 to 30 minims of tincture of valerian were also given daily; in cases of hypervagotonism tincture of belladonna, or Genatropine, were also given; these were effective, when given before gross side effects developed, in controlling toxic manifestations in most cases. Intolerance of conessine was particularly evident in the form of neurological and psychiatric changes which appeared in half the cases on the second or third days of treatment. They usually persisted for eight days after treatment and exceptionally, in those constitutionally liable to them, for as long as a month afterwards; in others they vanished spontaneously before the end of the course.

Intolerance is more prevalent and more marked in European women than in men, and it may be so severe as to necessitate the stoppage of treatment. In two women suffering from hypertension, tachycardia, shortness of breath, precordial pain, and a fall in blood pressure after an initial rise, temporarily caused some anxiety. Alcoholism predisposes to complications. Sympathetic nervous system involvement is manifested by sweating around the neck, tingling sensations especially in the sweat-secreting parts of the skin, and sensations of cold or of pins and needles in the skin, flushing of the face, distress on exertion which is not due to cardiovascular changes, giddiness and buzzing in the ears, a feeling of constriction in the throat, and tremors. Psychic manifestations take the form of dreams and nightmares, the apprehension from which persists into wakefulness; insomnia is a major and commonly occurring annoyance. No objective manifestations in the central nervous system or in the peripheral nerves, such as result from emetine poisoning, were detected. Salivation and a metallic taste were frequent and persistent. Initial anorexia usually gave way to a full restoration of appetite; occasionally nausea, and rarely vomiting, were encountered. The pulse, if it was affected, was slightly slowed and in these cases the arterial tension fell slightly. The urinary and the haemopoietic systems were unaffected. To sum up, slight degrees of intolerance were frequently seen but they were of little consequence; barbiturate sedation should be given systematically and should be reinforced where necessary by symptomatic treatment of the side effects.

The earlier cases of amoebiasis treated with "Roquessine" included 12 acute cases of intestinal amoebiasis suffering a first attack of amoebic dysentery. In these the abdominal pains vanished in 48 hours; the stools became normal

between the fourth and ninth days and amoebae vanished from the stools in 48 hours together with co-existent flagellates, but cysts usually persisted to the end of treatment.

In 15 acute cases of relapsing intestinal amoebiasis (with from two to seven relapses), all of whom had received previous emetine treatment, and some of them penicillin and sulphaguanidine, parasites disappeared in two or three days and the stools became normal usually between the third and sixth days; symptoms disappeared and the appetite, general condition, and in some cases the weights of the patients were restored to normal by the end of treatment. So successful was the treatment that men were retained in the East whose condition before treatment seemed to necessitate repatriation.

Two cases of "true chronic amoebic dysentery" were treated, one of which had proved refractory to emetine treatment, and the other to emetine-penicillin-sulphaguanidine and to arsenicals; in the former a course of "Roquessine" caused the disappearance of amoebae from the stools and their replacement by cysts in three days, the stools becoming formed by the 17th day. In the second, though the drug caused sympathetic disturbance and insomnia, the abdominal pains disappeared, the appetite was restored and the patient gained weight, but the stools continued loose throughout the ten days' treatment though subsequently they became formed.

Twelve cases of chronic amoebiasis with diarrhoea were treated. In only six of these were amoebae present in the stools at the time of treatment; in three they had been found at an earlier date [in the remaining three none had been detected]. In seven of these cases the stools became formed between the 6th and the 27th days; in three cases although the stools remained loose the symptoms and signs abated; in one case, of nearly ten years' duration and repeatedly treated with emetine, no benefit resulted from "Roquessine" treatment, and in yet another also there was no improvement following it.

Two cases of chronic amoebiasis with constipation [in one of which no parasites had been found and the history and physical signs were very dubious] were treated with "Roquessine" and both cleared up in a spectacular fashion.

In two cases of chronic amoebiasis with alternating constipation and diarrhoea the symptoms disappeared within 15 to 20 days.

Three patients suffering from sequelae of amoebiasis were treated with conessine. The first presented a classical picture of sprue [but no evidence of amoebiasis] which had resisted classical sprue treatment; this patient was much improved, if not cured, by a course of conessine. Another similar case, but with a history of amoebiasis parasitologically diagnosed in 1926 and treated with emetine in 1947, temporarily benefited from conessine treatment but relapsed; the third, another classical case of sprue, who had had parasitologically diagnosed amoebiasis in 1946 and been treated with emetine, improved with conessine treatment.

Twelve cases of pre-suppurative amoebic hepatitis, four without pyrexia, responded immediately to conessine treatment, the symptoms and signs of liver involvement and of acute intestinal amoebiasis rapidly vanishing. In addition a case of pulmonary amoebiasis secondary to liver infection rapidly cleared up with conessine treatment.

The author concludes that the therapeutic results obtained in the treatment of the first 135 cases of amoebiasis of all types in Cochin China are comparable to those obtained at Dakar. While the response to treatment varies with the type of case, the aggregate results are good. In early acute amoebiasis they were remarkably good; in relapsing acute amoebiasis they were good but the response was less rapid; in chronic relapsing amoebiasis although the results were encouraging too few cases were treated to arrive at any firm conclusion, though it was evident that conessine can be substituted for emetine in such

cases when the latter proves inadequate. In chronic amoebiasis with diarrhoea the results were inconstant, good results being obtained in only half the cases ; in chronic amoebiasis with constipation the results were good ; in chronic amoebiasis with alternating constipation and diarrhoea the results were also quite good. In cases of sprue—" a sequel of amoebiasis "—the results were contradictory ; in cases of pre-suppurative hepatitis the results were excellent.

" Roquessine " caused amoebae to vanish from the stools in two to three days, but they often persisted in the colon (sigmoidoscopic scrapings) ; cysts in the stools were unaffected by conessine treatment. Flagellates, where present, vanished from the stools, but an *Entamoeba coli* infestation was unaffected by the drug. In view of the persistence of an *E. histolytica* infection in so many cases after conessine treatment, this should be followed by a course of treatment with stovarsol.

As an appendix are recorded briefly the results of treatment of 105 additional cases of various types of amoebiasis. These confirm the provisonal conclusions reached above.

iii. Only after thirty years' daily clinical usage and extensive laboratory study has an adequate estimate of the value of emetine been reached. Though conessine undoubtedly is of value in amoebiasis, and there have been many optimistic reports on it, prolonged studies, both laboratory and clinical, are necessary for its proper assessment ; early impressions gained from the cure of, or improvement in, cases of amoebiasis treated with conessine alone are insufficient.

Amoebae only grow freely in culture media which are in part solid and in part fluid ; that most employed consists of a coagulated horse serum slope covered with a mixture of seven parts Ringer solution and one part horse serum, to which is added rice starch. Chemical compounds added to this medium are distributed unequally between the fluid and solid constituents ; this was shown by Laidlaw, Dobell and Bishop some 20 years ago to be the case with emetine. They found emetine, when added to the liquid component of the medium, in some days to be reduced in amount by as much as 90 per cent. As a result they recommended that in assessing the value of speculative compounds with such a medium emetine should be used as a basis for comparison. Composite media have been discarded in favour of liquid media for the examination of drugs, in spite of the inferiority of these in promoting growth of the amoebae. JOHN, using liquid media, showed amoebae to be 10 to 50 times as susceptible to emetine in an alkaline as in an acid solution. He found that emetine, added to a culture immediately before sowing, inhibited growth in concentrations of between 1/1,000,000 and 1/5,000,000 in an alkaline medium, and between 1/100,000 and 1/500,000 in an acid medium. If however the emetine were added to an established culture of amoebae a concentration of 1/50,000 was necessary to kill it in five days (this is a " true lethal action "). The figures in the literature for conessine are less precise, but they indicate that conessine is anything from 4 to 140 times as actively amoebicidal as emetine *in vitro*.

The authors consider that figures for amoebicidal concentration of a drug obtained by using purely liquid media are unduly favourable to the compounds tested, as the amoebae are not growing under optimum condition of culture ; for this reason they prefer composite solid and fluid media, in spite of the uncertainty as to the drug concentration in such media. After trial, a technique for determination of the effective concentration of the added drug in the medium, based on that of MASCRE and LOISEAU, was adopted. Briefly, this consists of precipitation by an excess of silico-tungstic acid of the alkaloids in an acid medium and their removal by centrifugation ; titanic chloride is added to the supernatant fluid and the resultant blue colour can be used for a

colorimetric estimation of unaltered silico-tungstic acid in the supernatant fluid; the amount of alkaloid can thus be calculated. Estimations with this technique of known concentrations of the hydrochlorides of conessine or of emetine in aqueous solution proved satisfactory. In sterile liquid culture media there is an apparent loss of the drug which increases with time, and is greater in the case of conessine than in that of emetine; the loss is possibly due to fixation or to destruction of the compounds. In mixed solid and liquid media, on the other hand, though the loss is even greater than in purely fluid media the recoverable amounts of the two alkaloids are about equal.

Two methods of determining the amoebicidal concentrations of conessine and of emetine *in vitro* were used. In the first the drug was added to the tubes immediately before infection, and they were examined after four days; in the second the drug was added to a four-day-old culture of amoebae, and the tubes were examined 24 hours later. Two strains of *Entamoeba histolytica* were employed; the first (Strain P) was obtained from a patient from Réunion, and had been maintained in culture only for a few weeks; the other (Strain M) had been maintained in culture for several years. Three tubes of each dilution of the drug under examination were put up in each experiment, together with controls; the parasites were studied microscopically for their general morphology and motility, and the ratio of dead to living organisms was determined. The results of experiments, with a mixed solid and fluid medium, are summarized in the following table:—

Strain	Dilutions causing inhibition of cultures at time of sowing		Dilutions killing 4-day cultures in 24 hours	
	Conessine	Emetine	Conessine	Emetine
Strain P ...	59,000 to 71,000	240,000 to 300,000	5,300 to 7,100	3,800 to 4,800
Strain M ...	45,000 to 52,000	210,000 to 260,000	4,100 to 5,350	2,850 to 3,450

From these figures it is concluded that Strain M is rather more resistant than Strain P to both drugs. The determined lethal concentrations of emetine added at the time of sowing the medium agree with those reached by previous workers, bearing in mind that at the start the *p*H of the culture tubes was 7·3 and that this changed to 6·8 in several hours and remained below 7·0; the lethal concentrations of conessine under the same conditions were found to be about four times as high as those of emetine; thus conessine proved only a quarter as effective as emetine when added to cultures of amoebae at the time of sowing. In experiments in which established cultures of amoebae were used, and in which the "true lethal action" of the drugs was revealed, conessine proved slightly more potent than emetine. While it is not possible to draw conclusions as to the therapeutic efficiency of the drugs from these results, it may be remembered that although four times as much conessine is necessary to produce the same effect *in vitro* the therapeutic dosage of conessine at present employed is at least five times as great as that of emetine.

Some studies were made on the elimination of conessine in those treated with a therapeutic dosage of the drug.

Faeces.—A satisfactory technique, basically similar to that already mentioned, was elaborated for the estimation of the alkaloidal content of

faecal suspensions. Analysis of stools from 15 patients undergoing a standard course of treatment with conessine failed to reveal the presence of the alkaloid in any specimen, even when a sample as large as 10 gm. of stool was examined. The inference is that the drug is destroyed or, much more probably, absorbed from the intestine, in which case it should be recoverable from the urine.

Urine.—DURIEUX, TRENOUS, TANGUY, ROBIN and RAOULT [this *Bulletin*, 1948, v. 45, 905] found that up to 140 mgm. of conessine was excreted in the urine daily by those undergoing treatment for amoebiasis; they found the urinary excretion of the drug to be slow and erratic. The technique for estimation they employed (a nephelometric method with Mayer's reagent) on re-examination gave inconstant results, and so estimations were made of the alkaloidal content of ether extracts of urine, with the technique already outlined; this method was found to give consistent and accurate results. Curves are given of the urinary excretion of conessine by three patients taking 0·5 gm. of the drug daily for six days, and by a volunteer taking 0·5 gm. daily for seven days and then 0·3 gm. daily for six more days. The drug was not found to cause diuresis. In the first three cases the maximum urinary excretion of the drug in 24 hours was 42 mgm. about the fifth day, a figure considerably below that recorded by the above-mentioned workers. On ceasing oral administration of the drug the excretion in urine rapidly fell, although in one case there was a brief paradoxical rise towards the eighth day; thereafter the excretion diminished until by the 15th day it ceased.

In the fourth subject, who was on a more prolonged dosage, the curve of excretion was similar and, again, excretion continued for ten days after cessation of the treatment. The gross amount of drug excreted in the urine by any of these patients was less than 10 per cent. of that administered; the balance of the drug was therefore either destroyed or fixed.

It proved impossible to determine the blood levels of conessine as the amounts were so small. After addition of conessine to uncoagulated blood and incubation for some hours it was possible to recover all the drug added, and this was found to be equally divided between the plasma and the cellular constituents.

A. R. D. Adams

McVAY, L. V., LAIRD, R. L. & SPRUNT, D. H. **A Preliminary Report of the Successful Treatment of Amebiasis with Aureomycin.** *Science.* 1949, June 10, 590–91.

The treatment of amoebiasis with the drugs currently used is unsatisfactory and involves the risk of toxic reactions. Aureomycin hydrochloride treatment had been noticed to alter the stools and to reduce their content of bacterial flora, so three microscopically proven cases of intestinal infection with *Entamoeba histolytica* were treated with a gross dosage of from 19 gm. to 22·7 gm. of the drug. The blood levels estimated in two of the cases were 8 μgm. per cent. In all three cases the parasites vanished from the stools within a few days, and subsequent examinations, by wet and by stained films and by culture, on 6 to 14 occasions failed to show a recurrence. Another 11 cases of amoebiasis have similarly since been successfully treated. The amoebae from the first three cases were cultured on Nelson's egg yolk alcoholic extract medium [this *Bulletin*, 1948, v. 45, 179] and aureomycin was added to the overlay of subculture tubes in concentrations of from 0·2 to 3·2 mgm. per ml.; the tubes were examined 6, 18, and 48 hours later. A concentration above 0·8 mgm. per ml. of aureomycin killed all amoebae in six hours; the majority of the amoebae were killed by 0·2 and by 0·4 mgm. per ml. in 18 hours; no amoebae survived the lowest concentration (0·2 mgm. per ml.) for 48 hours. It is suggested that

the high blood levels reached in aureomycin treatment may render the drug effective in extra-intestinal amoebic infection as well as in cases of purely intestinal infection. *A. R. D. Adams*

CAMBIES. Nouvelle méthode de traitement de la dysenterie amibienne et de la lambliase intestinale. [**A New Form of Treatment for Amoebic Dysentery and Giardiasis.**] *Bull. Acad. Nat. Méd.* 1949, v. 133, Nos. 15/16, 348–50.

Lambliasis and amoebiasis are commonly found to occur concurrently, both in those infected overseas and in those infected in metropolitan France. Their presence should be suspected in ill-defined cases of intestinal or of gall-bladder upset. The amoebae normally inhabit, in particular, the upper and the lowermost parts of the large intestine ; *Giardia* occurs in the duodenum, the ileum, the gall bladder and the liver. The classical treatments for these infections produce inconstant results, and a suitable therapeutic agent would be a non-toxic drug for oral administration which is parasiticidal to both organisms, and is concentrated in the liver and excreted in the bile. "*Le dérivé disodique de l'acide* (3′ 5′, 3″ 5″ *tétraiodo*, 4′ 4″ *dioxy-triphényl-carbinol*) *carboxylique* 2″ [the disodium derivative of 3 : 3′ : 5 : 5′ -tetraiodo-4 : 4′ -dihydroxy-triphenyl carbinol-2″ carboxylic acid] appears to fulfil these conditions. Administration of this compound to a total of 12 gm., given in cachets in three doses over a period of 36 hours, to some 300 patients since 1944 has shown it to be effective in eradicating *Giardia* and amoebic infestations ; further details are to be published. *A. R. D. Adams*

TORGERSEN, O. Balantidium-dysenteri. [**Balantidial Dysentery.**] *Nordisk Med.* 1949, July 29, v. 42, No. 30, 1271–3, 4 figs.

The English summary appended to the paper is as follows :—

"A 60-year-old farmer's wife suffered for four months from severe diarrhea. Blood was occasionally detected in the stools, but bacteriologic and serologic examinations were negative. Microscopy of the feces was performed once only, the result being negative. Examinations of the gastric contents revealed achlorhydria. The patient's general condition grew worse, and there appeared signs of severe anemia, and finally a clinical picture resembling pellagra. Autopsy revealed thrombosis of the right femoral vein, pulmonary embolism, fatty degeneration of the liver and of the renal tubules, degenerated myocardial fibers and severe colitis with multiple small ulcers and petechial hemorrhages. Numerous trophozoites of Balantidium coli were found in the vicinity of the ulcers. The present case is the fourth reported in Norway."

RELAPSING FEVER AND OTHER SPIROCHAETOSES

KONITZER, L. **Relapsing Fever in Ambulatory Practice.** *Acta Med. Orientalia.* 1949, Mar.–Apr., v. 8, Nos. 3/4, 48–53. [13 refs.]

A review of 26 cases of relapsing fever, all in adult Arabs in Palestine, in which smears of the peripheral blood were positive. With one exception these were thought to be caused by tick infection and the patients gave a history of having slept in the open-air or in caves ; the one exception was almost certainly louse-borne.

The author recommends : (1) routine examination of thick and thin films stained with Giemsa's stain and (2) careful taking of histories, in all cases of

pyrexia. As regards (1) it may be noted that spirochaetes were found on routine examination of thin films in four instances only and that the blood was often positive during apyrexial periods. Penicillin as a therapeutic measure was considered to be too expensive and not practicable in out-patient cases: treatment with arsenicals was given in the form of carbarsone by mouth, 0·75 gm. daily for five days or neoarsphenamine intravenously (0·01 gm. per kilo. body weight), the latter being preferred when atebrin [mepacrine] is given simultaneously. Treatment should be given irrespective of the state of the temperature. [The reviewer, in his experience of the African type of relapsing fever, agrees with this.] Iritis and iridocyclitis were not met with in this series. No mention is made of the type of tick incriminated. *C. F. Shelton*

BOIRON, H. Deux années de recherches sur les spirochètes récurrents à l'Institut Pasteur de Dakar. [**Two Years of Research on Relapsing Fever Spirochaetes at the Pasteur Institute, Dakar.**] *Bull. Méd. de l'Afrique Occidentale Française.* 1948, v. 5, No. 1, 173–91.

A general summary, written with the object of presenting a clear picture of the epidemiology of relapsing fever with special reference to work carried out at the Pasteur Institute, Dakar. The small mammals of the district are well known to act as reservoirs of the infection and details are given of the results of one year's examination of 512 rodents and insectivores captured in the town of Dakar during the year 26th September, 1946, to 25th September, 1947.

Species of mammal	Number examined	Infected		Blood film +	Blood inoc. +	Brain inoc. +	Spleen inoc. +
		Number	Percentage				
Cricetomys gambianus	68	55	80·88	1	18	54	35
Arvicanthis rufinus ...	14	11	78·57	4	9	11	9
Rattus r. alexandrinus	343	120	34·98	10	57	117	74
Rattus norvegicus ...	37	8	21·62	1	6	8	6
Rattus r. rattus ...	40	6	15·00	0	3	5	6
Mastomys coucha ...	1	1	—	0	1	1	1
Taterona gambiana ...	1	0	—	0	0	0	0
Mus musculus ...	6	0	—	0	0	0	0
Hedgehog	2	2	—	0	1	2	1
Totals ...	512	203	39·64	16 3·12%	95 18·55%	198 38·67%	132 25·78%

In view of their habits the two most serious carriers of the infection are considered to be *Cricetomys gambianus* and *Rattus rattus alexandrinus.*

During 1946 and 1947, a total of 92 cases of relapsing fever were noted, comprising 58 Europeans and 34 Africans. The great majority of these cases (79) occurred in the European part of the town generally known as Dakar; only 13 cases occurred in the native town Médina. The prevalence of infected rodents in the two districts is very similar, and the difference in the rate of human cases would seem to be the result of Dakar having a much more favourable soil for the construction of burrows in which the transmitting host, *Ornithodorus erraticus* finds suitable conditions for survival. To combat the disease, therefore, it is desirable to search for all animal burrows, and treat them with chloropicrin followed by stopping up the holes.

The second part of this paper is devoted to a consideration of the transmission of relapsing fever spirochaetes by *Ornithodorus* and by lice.

It is well known that *S. hispanica* is transmitted in nature by *Ornithodorus erraticus*. Experiments with lice have given conflicting results but the author obtained transmission in two cases by the inoculation of the contents of infected lice into monkeys and white mice. The spirochaetes, after being ingested by lice, soon become non-motile and disappear, but reappear on the 12th day and persist up to the 24th day after an infective meal. The contents of these lice are infective from the 5th day, indicating the presence of a non-spirochaetal stage of the organism since spirochaetes as such only re-appear on the 12th day. All lice do not become infected when fed on relapsing fever cases, but it is suggested that this is the result of the blood containing too few spirochaetes.

The transmission of *S. duttoni*, var. *crocidurae* is next considered and the author gives details of five experiments carried out with this organism. In three cases the spirochaete was transmitted by *Ornithodorus* but not by lice. In two later cases, however, white mice were infected by the inoculation of the contents of lice that had been fed on the blood of a monkey containing numerous spirochaetes and subsequently maintained on normal human blood. The contents of the lice first became positive six days after the infected meal, and remained infective up to the 26th day.

It is evident that the experimental transmission of both *S. hispanica* and *S. duttoni* var. *crocidurae* by means of lice is possible, and the problem arises whether such transmission ever occurs in nature. During 1948, the author investigated about 40 cases of louse-borne relapsing fever at Zinder, in the Niger Territory, where an epidemic started in April, 1947. Four young monkeys were successfully infected by intraperitoneal inoculation of blood from patients during the first attack. Newly born white rats and mice were also infected but relapses were never observed and the author was unable to repeat the results of BALTAZARD *et al.* [see this *Bulletin*, 1947, v. 44, 905] with newly-born rabbits.

Finally the author discusses the epidemiology of louse-borne relapsing fever (*S. recurrentis*). Up to now no animal reservoir has been found, but it is difficult to accept the view that man is the reservoir, and lice can also be excluded, for the infection is not hereditary.

In view of the fact that at least five strains of spirochaetes (*S. hispanica*, *S. microti*, *S. turicatae*, *S. hermsi* and *S. duttoni* var. *crocidurae*), normally transmitted by ticks, have been transmitted experimentally by means of lice, it is reasonable to assume that other strains may be equally labile. The long intervals between epidemics of *S. recurrentis* could most easily be explained by assuming the existence of animal reservoirs (small mammals and ticks), but hitherto no tick has been found infected with this strain. *E. Hindle*

BOIRON, H. Quelques considérations sur la fièvre récurrente à tiques dakaroise. [**Some Observations on Tick-borne Relapsing Fever in Dakar.**] *Bull. Soc. Path. Exot.* 1949, v. 42, Nos. 1/2, 13–15.

——. Considérations sur la fièvre récurrente à tiques au Sénégal. L'importance du rat comme réservoir de virus. [**Observations on Tick-borne Relapsing Fever in Senegal. The Importance of the Rat as a Reservoir of Infection.**] *Ibid.* 62–70. [33 refs.]

The contents of both these papers are contained in the author's previous publication noticed above. *E. Hindle*

BOIRON, H. Transmission par le pou de *Spirochaeta duttoni* var. *crocidurae*. [**The Transmission of** *Spirochaeta duttoni* **var.** *crocidurae* **by the Louse.**] *Bull. Soc. Path. Exot.* 1949, v. 42, Nos. 3/4, 91–3.

The author infected white mice by the inoculation of an emulsion of lice 6 to 14 days after the lice had been fed on a baboon containing in its blood three spirochaetes per microscopic field. These lice had subsequently been fed on a non-immune human subject, who showed no signs of infection as a result of their bites even though the insects contained infective spirochaetes. [These results confirm those previously recorded by MATHIS [this *Bulletin*, 1928, v. 25, 588], and HEISCH & GARNHAM [*ibid*, 1948, v. 45, 603].] *E. Hindle*

DELPY, L. P. Au sujet de *Spirochaeta microti* Rafyi, 1946. [**Concerning** *Spirochaeta microti* **Rafyi, 1946.**] *Bull. Soc. Path. Exot.* 1949, v. 42, Nos. 5/6, 147–8.

A brief summary of information concerning this spirochaete which was first recorded by RAFYI in the blood of a *Microtus* in the neighbourhood of Hessarek [this *Bulletin*, 1947, v. 44, 92]. ROUSSELOT subsequently isolated a spirochaete from the blood of *Tatera indica*, caught in the same district, which seems to be the same species.

The author states that his colleague, R. MAGHAMI, during the past two years, has found that 35 per cent. of the *Tatera* in this district are infected, 40·4 per cent. of the *Meriones*, and 14·8 per cent. of the hamsters. [See below.] The numerous strains all have the essential characters of *S. microti*. *E. Hindle*

RAFYI, A. & MAGHAMI, G. R. Recherches sur l'infection expérimentale des rongeurs par *S. microti* Rafyi 1946. [**Researches on the Experimental Infection of Rodents with** *S. microti* **Rafyi 1946.**] *Bull. Soc. Path. Exot.* 1949, v. 42, Nos. 5/6, 215–21.

In the neighbourhood of Hessarek the following species of wild rodents have been found naturally infected with *Spirochaeta microti* :—

Rodent	Percentage infected			
	1946	1947	1948	Average
Meriones persicus	—	50	30·7	40·4
Tatera indica	—	20	50	35·0
Nesokia indica	0	36·4	0	12·1
Mus musculus	16·7	0	0	5·5
Cricetulus migratorius isabellinus	18·7	25	0	14·6

Three of these strains, one from *Mus musculus* and the other two from hamsters, were selected, as they showed different degrees of virulence in white rats, that from the mouse (S2) being little pathogenic, while one of the hamster strains (S1) was moderately pathogenic and the other (S3) fully virulent.

The strain S1 gave immunity against strains S1 and S2 and slight protection against S3. Strain S2 protected against S2 and S1. Strain S3 conferred protection only against the same strain.

All the ordinary laboratory rodents, including rabbits, guineapigs, rats, mice and hamsters were found to be susceptible. The adult rabbit and guineapig showed no obvious signs of infection and usually spirochaetes were not found, yet the blood remained infective to white rats for long periods ; blood was

infective for white rats up to 100 days in the case of the guineapig. The absence of any reaction in adult guineapigs provides an easy method of distinguishing *S. microti* from *S. persica*; in the latter the infection produces definite febrile attacks with spirochaetes in the blood. Young animals were found to be very susceptible to *S. microti* and showed numerous spirochaetes in the blood and in the case of young rabbits sometimes died with signs of haemorrhagic jaundice.

White rats are very susceptible. With a mildly virulent strain, a benign infection is produced (1 spirochaete to 100 fields in the blood) but the virulent strains produce a mortality of 60 to 70 per cent. The incubation period is 1 to 4 days and the animals generally succumb on the fourth to seventh day of the disease with numerous spirochaetes in the blood. Splenectomy renders the white rat much more susceptible and even mildly virulent strains produce fatal infections.

Sheep and dogs were found to be slightly susceptible, showing either a latent or benign infection.

One of the authors became accidentally infected with this spirochaete after a probable incubation period of about 25 days. The infection lasted a month with three febrile attacks (up to 104·2°F.) each of 2 to 3 days, separated by intervals of 10 to 12 days. During the febrile attacks, there were rare spirochaetes in the blood, with general symptoms such as headache, pains in the joints, and gastric disturbances. Treatment with neoarsphenamine after the third attack was followed by complete recovery.

Residual infections remain in apparently recovered animals, the brain of the guineapig being still infective 593 days after the original infection.

In nature *S. microti* is usually transmitted by *Ornithodorus erraticus*, in which the infection is hereditary, and more rarely by *O. tholozani*. Experimentally the infection has been transmitted by the bites of *O. lahorensis* and *O. canestrinii*, and by inoculation of the contents of *Argas persicus*. The spirochaete retains its virulence at least 360 days in *O. lahorensis* and 731 days in *O. canestrinii*.

In the discussion following the paper M. Colas-Belcour stated that the spirochaete referred to as *S. taterae* by Rousselot and Rafin-Duvolon, had the same general characters as *S. microti*. *E. Hindle*

YAWS

Montel, M. L. R. Le pian tertiaire maladie sociale (en Indochine). [**Secondary Yaws as a Social Disease in Indo-China.**] *Bull. Soc. Path. Exot.* 1949, v. 42, Nos. 5/6, 210–15, 12 figs. on 6 pls.

The term " tertiary yaws ", including certain tertiary lesions which encroach upon the secondary stage, is convenient and justified by analogy with the evolution of syphilis. Tertiary yaws is characterized by chronic nodular, ulcerative and gummatous lesions of the skin, bones, periosteum and joints. *Treponema pertenue* is nearly always absent from them. The tertiary stage suggests a sensitization of the body, and histologically the lesions have a tuberculoid character. Not all yaws cases develop tertiary lesions, for in many the condition is cured after the secondary stage, if not serologically at least clinically, and the patient appears normal. This arrest is most frequent in well-nourished and prosperous populations. Where chronic famine prevails, tertiary lesions are frequent and grave.

Lesions of the tertiary stage which encroach on the secondary are (*a*) palmar and plantar hyperkeratoses of various forms (punctate, fissured, trichophytoid,

desquamating, verrucose or " worm-eaten "), which are only the eruption of secondary lesions (raised circular desquamations, pemphigus or fissured pianomes) progressively transformed and organized by hyperkeratosis; (*b*) osteo-periosteal lesions of the fingers and toes, a yaws *spina-ventosa*, which are often seen in the secondary stage and yet have undoubted characters of tertiary lesions. [The reviewer believes that the characteristic of tertiary lesions is tissue destruction which these borderline lesions probably lack.]

True tertiary yaws lesions begin 3–10 years after the onset of the disease and rarely later :—(*a*) Ulcers starting as cutaneous or subcutaneous gummata which break down and spread peripherally. They may involve underlying bones. Sometimes while the lesion is extending, parts of it may be healing. Keloids may be formed. Tenosynovitis and synovitis are not unusual in this stage. (*b*) Osteo-periosteal and articular lesions with periosteal diaphysial thickening, and osteal and subperiosteal gummata with condensation of bone round the lesions, and occasionally obliteration of the medullary canal. Bone lesions may frequently cause sabre tibia. Gummata may ulcerate and give rise to prolonged suppuration and scarring with contractures. The epiphyses and articular parts are less frequently involved than the diaphyses except for osteoporosis. No spontaneous fractures were seen by the author. When tertiary lesions are widespread, profound and sometimes fatal cachexia may be produced. Such widespread lesions are not seen in syphilis. (*c*) Deformities and contractures resulting from scarring produce permanent disability and atrophy, especially of the limbs, and are very characteristic of healed tertiary yaws. It is these which have caused the author to call yaws a social disease. Certain lesions may result in patchy depigmentation and atrophy of the skin. (*d*) Gangosa is not frequent in Indochina, but juxta-articular nodules are. The author has not seen goundou in Indochina. Leuco-melanoderma and hyperkeratoses of the skin, palms and soles are of the same stage as juxta-articular nodules [but no further description is given in this article].

[The importance of yaws as a cause of suffering in a community is not generally recognized. The misery of tertiary yaws of a few years' standing is specially stressed by the author.] *C. J. Hackett*

LEPROSY

NAKAMURA, K. **Studies on Cultivation of the Leprosy Bacillus.** *Hawaii Med. J.* 1949, Mar.–Apr., v. 8, No. 4, 265–6.

This paper is of interest owing to the care taken to avoid the difficulty of determining if the enormous number of lepra bacilli usually introduced into culture media have really multiplied or not. In the present experiment after a second centrifugation of the leprous material the supernatant fluid which was added to the medium contained only 1–3 bacilli per microscopic field. The medium contained small percentages of mucin 0·4 per cent., soluble starch 0·2–0·4 per cent., glycerin 2·0 per cent., malachite green 0·001 per cent., dissolved in distilled water and 5·0 per cent. of human or ox serum added immediately before use. The following additional ingredients were also shown to be favourable to growth : phthiocol 1γ, vitamin B_1 1γ–4γ, and vitamin B_2 1γ–4γ per cc. of culture media. The cultures were incubated at 37°C. for 3 days, at 25°C. for three days, and so on repeatedly. After four or more weeks stained films showed a definite picture of multiplication of the organisms of either human or of rat leprosy in accordance with the inoculum. Subcultures

at six to eight weeks with one drop of a culture produced conglomerations of organisms in a stained film in the case of the rat leprosy bacillus repeatedly and occasionally with the human organism ; with the former bacillus rats were successfully inoculated with cultures of the first generation. *L. Rogers*

VEGAS, M., CONVIT, J. & ESPIN, J. **Studies on the Reticulum in the Different Types of Leprosy.** *Internat. J. Leprosy.* 1948, Oct.–Dec., v. 16, No. 4, 443–50, 8 figs. on 2 pls.

Reticular fibres can be differentiated from collagen fibres by being profusely anastomosed and they are stained dark brown or black by colloidal silver, while collagen becomes yellowish. Reticulin may be produced from fibroblasts, reticulo-endothelial cells and from blood capillaries. Reticular fibres are arranged about vacuolated cells of Virchow in leprosy. Forty specimens of neural and lepromatous types have been studied with the following results. The reticular formation is a tridimensional network surrounding the granulomatous cells in the inflammatory reaction zones of the simple macular lesions, and grows complex in lepromatous lesions and in tuberculoid lesions and they play an active part in the defensive processes against the leprosy bacillus.

L. Rogers

CASTAÑE DECOUD, A. **Comparative Study of the Nerve Branches of the Skin in Tuberculoid and Lepromatous Leprosy.** *Internat. J. Leprosy.* 1948, Oct.–Dec., v. 16, No. 4, 451–8, 7 figs. on 2 pls.

Nerve injury is more serious in tuberculoid than in lepromatous leprosy, but can be demonstrated in both forms. A histological analysis has been made in a series of skin sections from six cases of each form of all nerve branches and of lepra bacilli in them with the following results, which are shown in two tables, and illustrated by plates. In the tuberculoid form infiltration with destruction of the nerves is the characteristic change and in the lepromatous variety infiltration and the frequent presence of the bacilli predominated. Nerve branches are more frequently found in the lepromatous variety. The greater number of bacilli with less destruction of the nerves in lepromatous lesions indicates that in the tuberculoid cases the nerve destruction is due to an allergic reaction. The lesions described are well shown in the illustrations.

L. Rogers

ALVAREZ LOWELL, L., PUCHOL, J. R. & RODRIGUEZ PEREZ, A. P. Aportación al conocimiento histopatológico sistema nervioso periferico en la lepra. [**Contribution on the Pathological Histology of the Peripheral Nervous System in Leprosy.**] *Internat. J. Leprosy.* 1948, Oct.–Dec., v. 16, No. 4, 459–64, 16 figs. on 5 pls.

The changes described were based on complete autopsies of two patients dying from the lepromatous form of the disease, and biopsy specimens of five leprosy patients of different types and in different stages. The changes are described as they occurred in the spinal ganglia, the peripheral nerve trunks and the nerve endings. Each of these is described minutely and illustrated by photomicrographs. In the ganglia appear cells, some swollen and enlarged, others staining badly and obviously degenerating ; the capsules are swollen but in no case was there any proliferation of the connective tissue. There was, however, some proliferation of endocapsular glia cells ; certain of the cells showed hyperpigmented masses, but no neurofibrillar structure could be made out ; merely irregularities in the reticulum. The cells were much

altered, with irregular borders and often reticulated ; some were reduced in size, retracted, with marked argentophil masses. The significance of these changes, whether they are primary or due to the bacteria or their toxin, is not at present known.

The peripheral nerves most affected were the cubital, external popliteal, the facial and the median ; the radial and the internal popliteal less often. The axis cylinder appeared fragmented with a terminal thickening. In places there was an accumulation of the silver impregnation so that no structural change could be made out ; in others the axon seemed to have been totally destroyed. Changes in the sensory terminals were studied in parts of the skin where there were macroscopic lesions and also in parts showing no obvious changes. In lepromatous areas the degeneration of the fibrils and terminal corpuscles might be complete, with hyperplasia of the cells of Schwann. Even in parts showing no signs, for example, the skin on the pulp of the finger, there was infiltration, the Meissner corpuscles were swollen and some of the tactile corpuscles presented early signs of degeneration. In the subcutis the corpuscles of Pacini showed hypertrophy of the capsules, but degeneration of the fibrils. [The full significance of the changes will be better appreciated by a study of the photomicrographs which are well reproduced.] *H. Harold Scott*

CHAUSSINAND, R. Tuberculose et lèpre, maladies antagoniques. Éviction de la lèpre par la tuberculose. [**Antagonism of Tuberculosis and Leprosy.**] *Internat. J. Leprosy.* 1948, Oct.–Dec., v. 16, No. 4, 431–8. [22 refs.]

This paper deals with the much discussed subject of the relation between leprosy and tuberculosis, mostly on the usual lines. The resemblances between the two diseases are first pointed out and the possibility is noted of a certain degree of crossed " premunition " which may have been a factor in the decline of leprosy in the Middle Ages, followed by a more recent decline in tuberculosis. Mitsuda tests in 1,500 persons suffering from leprosy indicated that positive reactions showed relative resistance to leprosy and that mankind and animals infected with the tubercle bacillus commonly give positive Mitsuda reactions, but non-tuberculous subjects are negative ; evidence of this is given. Thus the subjects of mild tuberculous infections develop a certain degree of premunition against leprous infection. The author therefore questions the conclusion of Rogers and Muir that the frequency of tuberculous complications of leprosy patients are contrary to this view, as being too categorical, since he found a certain degree of resistance against the tubercle bacillus only in allergic cases of leprosy ; but persons anergic to the leprosy bacillus have no protection against tuberculous infection on account of previous leprous infection. Thus, fatal tuberculous complications occur only in anergic leprosy, and the tuberculosis index will be feeble in areas where leprosy has been recently imported. Data from a number of countries are quoted to indicate that leprosy spread prior to tuberculosis and that the latter disease has not yet reached a high degree of prevalence in the greater part of the world in which leprosy is most prevalent. The author therefore concludes that the progressive eviction of leprosy by tuberculosis is the dominant phenomenon resulting from a relative crossed premunition of the two infections. *L. Rogers*

FIGUEREDO, N. & DESAI, S. D. **Positive Bacillary Findings in the Skin of Contacts of Leprosy Patients.** *Indian J. Med. Sci.* 1949, Apr., v. 3, No. 4, 253–65, 2 figs. on pl.

Visits of trained observers to the homes of leprosy patients to watch for house contacts in Bombay have yielded the following results.

Among 1,049 contacts of 217 cases of leprosy, 573 were examined clinically and bacteriologically and 319, or 55·67 per cent. showed clinical symptoms; 171 of these also showed bacteriological evidence, and 25 of them showed leprosy bacilli in the skin without clinical signs of the disease; these were mostly from the ears or on either side of the spine at the back. At least half an hour was spent in examining several sections of the skin. These showed organisms having the characters of lepra bacilli; four of the patients subsequently developed clinical symptoms and 9 of them gave positive lepromin reactions. *L. Rogers*

LATAPÍ, F. & CHEVEZ ZAMORA, A. **The "Spotted" Leprosy of Lucio (La lepra "Manchada" de Lucio). An Introduction to its Clinical and Histological Study.** *Internat. J. Leprosy.* 1948, Oct.–Dec., v. 16, No. 4, 421–30, 15 figs. on 4 pls. [17 refs.]

In 1852 LUCIO and ALVARADO described this form of leprosy in Mexico in three forms, namely nodular, anaesthetic and "lazarine" as characterized by "red and painful spots on the skin" of a serious nature. Recent writers, however, have used the term "lazarine" differently, so the present authors prefer to call the earlier described condition "pure primitive diffuse lepromatosis" and they describe and illustrate the following conditions:—

1. Diffuse cutaneous infiltration, either succulent or atrophic, accompanied by loss of eyebrows, eyelashes and hair from other parts of the body.
2. Secondary erythematous and inflammatory lesions of a vascular and proliferative nature with dark necrotic centres resulting in degeneration and depigmentation. Blisters or ulcers may result with a later tendency to fibrosis.
3. "The diffuse lepromatous cases showing the Lucio phenomenon give a special response to integral lepromin" first observed by Medina, which reveals an acute inflammatory process with polymorphonuclear and eosinophile leucocytes, ending in an intradermal abscess. *L. Rogers*

GUILLOT, C. F. & CAPURRO, E. T. Reacciones lepromatosas tratadas con propionato de testosterona. [**Lepromatous Reactions treated with Testosterone Propionate.**] *Prensa Méd. Argentina.* 1949, June 17, v. 36, No. 24, 1122–3.

The English summary appended to the paper is as follows:—

"The authors report two cases of lepra reaction, in women with lepromatous leprosy, with severe febrile and systemic symptoms. These alterations appeared periodically, closely related to menstruation and they were resistant to all common therapeutical resources.

"As from a clinical standpoint there was evidence of a hyperfolliculinic syndrome both patients received androgens, testosterone propionate, 25 milligrams, by intramuscular injection on the 8th, 15th and 20th days of the menstrual cycle. It prevented the onset of new reactions and permitted the prosecution of the specific treatment."

HERRERA, G. **Intradermal Administration of Promin.** *Internat. J. Leprosy.* 1948, Oct.–Dec., v. 16, No. 4, 439–42.

In this note the author reports on the injection of 40 per cent. solution of promin into lepromatous nodules on the ears, nose, etc., in 30 patients. Encouraging results followed within 80 days; a short bevelled needle was used. The injections are made slowly, to avoid rupture of the lesions, with doses not exceeding 0·5 cc. at any one point and a total up to 12·5 cc. repeated after four or five days when the reaction has disappeared. Softening and shrinkage

of the nodules ensued with eventual disappearance leaving deep scars, with or without discharge from the nodules in some, and small fine scars in others. From two to several injections were required to destroy nodules completely. Of 51 nodules on the ear, 42 were destroyed through expulsion of their contents and 7 were reduced in size. Only 7 scars could be regarded as unaesthetic. In a total of 30 cases the nodules were completely cleared up in 20, although they had previously resisted promin intravenously for 12 to 30 months. In the other 10 only partial success was obtained. Macules and plaques are present in too large numbers for this treatment owing to the intense pain and blisters resulting from the caustic nature of the drug. *L. Rogers*

ROW, R. **On the Experimental Transmission of Rat Leprosy in the Mouse with the Culture of Mycobacterium Stefanski isolated by Symbiosis.** *Indian Physician.* 1949, June, v. 8, No. 6, 145–9, 2 pls.

After reference to his previous paper on the cultivation of the bacilli of leprosy and of rat leprosy by symbiosis [see this *Bulletin*, 1949, v. 46, 264] the author records a single experiment of inoculation of a mouse intraperitoneally with rat leprosy material. When the mouse was killed after five months the liver and spleen were much enlarged and studded uniformly with pin-head granulomata containing globi and numerous acid-fast long bacilli which were cultivated by the author's method on glycerinated potato. This culture produced similar appearances when injected into a second mouse.

L. Rogers

HELMINTHIASIS

GÄRTNER, H. & MÜTING, Lieselotte. Beitrag zur Verbreitung der Wurmkrankheiten. [**On the Spread of Helminthiasis.**] *Deut. med. Woch.* 1949, July 15, v. 74, Nos. 27/28, 881–3. [18 refs.]

Helminthic infestation seems to have been increasing in Germany in recent years. Even before the war it was fairly high ; from East Prussia in 1932 came records of 24 per cent. *Ascaris* and 53 per cent. *Trichuris* infestation ; in Kiel in 1936 a general infestation of 42·6 per cent., with 38·2 per cent. *Trichuris* and 28·3 per cent. *Ascaris.* Outside Germany also incidence was high, in Italy, Switzerland and Russia between 20 and 40 per cent. ; in 1943 between 31 and 55 per cent. in Italy ; in 1922–27 between 29 and 50 per cent. in Russia. [These are given as "general figures of worm infestation" but they cannot surely apply to the whole of these countries.] The first-named author (Gärtner) in 1943 examined in France Frenchmen employed in German kitchens and found 16·2 per cent. infested ; among Germans similarly employed only 7·1 per cent. ; in Russia more than 20 per cent.

In Darmstadt after the war helminthiasis was very rife ; 77·5 per cent. of those examined [number not stated] were infested, the main source being, it appears, vegetables and fruit (strawberries) grown on irrigated soil, untreated waste-water being used for the irrigation. The authors examined 1,064 persons, the stools of 1,040 and anal smears of 150. Of 783 faecal samples sent in to the Hygiene Institute 496 (63·3 per cent.) were positive ; *Ascaris* in 361 (72·8) and *Enterobius* in 376 (75·8) ; *Trichuris* 23 (4·8) and *Taenia* 8 (1·6). Thirty were examined from the kindergarten ; 12 contained *Enterobius*, 5 *Ascaris* and 3 had both. Of 46 anal smears from the Children's Clinic, *Enterobius* was found in 41. One hundred and twenty-three young girls between 20 and 23 years of age at High Schools with "hygienic conditions above the average" had their faeces examined and 73·59 per cent. were positive, 43

with *Enterobius*, 23 with double infestation and 7 with *Ascaris* alone ; in 65 out of 104 the anal smear was positive. Of 82 workers in the irrigated fields 65 were positive. The irrigation water was examined, two samples being taken in the morning, at midday and in the evening and the average number of *Ascaris* ova found was 530 per cc., the extremes being 464 and 568. Since the accepted length of life of *Ascaris* ova in soil is 5 years, those working in these fields irrigated with untreated water are in perpetual danger of infestation.

H. Harold Scott

ALBORNOZ PLATA, A. El examen coprologico. Valorización estadistica del método de concentración sobre el método directo. [**Faecal Examination. Statistical Evaluation of Concentration as compared with Direct Examination.**] *Prensa Méd. Argentina.* 1949, May 27, v. 36, No. 21, 944–6.

The author has compared the results of direct examination of the faeces and a concentration method which he calls the American Armada [this is not defined] in 88 children, 8–16 years of age, in Bogotá, Colombia. He determined the percentage coefficient of infestation by *Ascaris*, *Trichuris*, *Giardia* and hookworm, and shows how much more satisfactory the concentration method is. Thus, the direct coefficients were 22·6, 53·4, 17·7 and 10·2 per cent. respectively, whereas those by concentration were 39·8, 69·2, 20·5 and 17·0.

He concludes that a *negative* direct examination is valueless, a *positive* has a qualitative, but not a reliable quantitative, value, and, secondly that concentration methods should be used in all laboratories. [He might add that, for purposes of inter-laboratory comparison, one particular concentration method should be agreed upon.]

H. Harold Scott

RAVELLI, A. Zum röntgenologischen Erscheiningsbild höherer tierischer Parasiten in der Lunge des Menschen. [**X-Ray Appearances of the Higher Animal Parasites in the Human Lung.**] *Med. Klin.* 1949, May 13, v. 44, No. 19, 603–6. [Numerous refs.]

In the author's view X-rays of the lungs can be of considerable help in the diagnosis of certain worms and arthropods. He describes the appearances in the following 7 infestations :—

1. *Schistosomiasis.*—In the acute state miliary shadows, of the size of millet seeds ; distinguished from tuberculosis because the apices are free ; later the shadows are larger, to the size of a pea or even bean.

2. *Paragonimiasis.*—Extensive diffuse bronchiectasis with shadows about 8–10 times as large as a pin's head.

3. *Cysticercosis.*—Small opacities up to 4 mm., rounded or oval, umbilicated. Extrapulmonary cysticerci, calcified and uncalcified, may be seen.

4. *Echinococcus cyst.*—Usually solitary, varying greatly in size from that of a pea to that of a human head, mostly homogeneous. The *Ablösungsphänomenon* may be seen—a clear half-moon zone due to the presence of air between the cyst and the lung tissue at the upper pole of the cyst, or the symptom which the author calls *Kopfsteinpflaster*, in which the daughter-cysts floating in the mother-cyst produce an undulating borderline.

5. *Echinococcus alveolaris.*—Coin-like shadows, from a pea to a walnut in size, with clear-cut but irregular borders.

6. *Pentastomiasis.*—Usually subpleural in position, the size of a pea, kidney-shaped non-homogeneous opacities with a clear-cut edge. The larva may or may not be calcified.

7. *Porocephaliasis.*—Opacities millet-seed in size and trapezoid in shape ; with double-contoured rings and typical segmentation. Extrapulmonary calcified forms may be seen.

H. Harold Scott

CALDERÓN RODRÍGUEZ, Judith. Algunos datos sobre antihelminticos intestinales. [**On Intestinal Anthelmintics.**] *Rev. Kuba Med. Trop. y Parasit.* 1949, Mar.–Apr., v. 5, Nos. 3/4, 41–7. [Bibliography.]

A useful summary of the subject ; in fact it seems to have been a lecture delivered to the Parasitological Section of the National School of Biological Science, Mexico. The author notes first the difference between vermifuges and vermicides and then divides active anthelmintics into four groups : 1. Crude drugs as used by indigenous populations ; 2. Refined or partially refined products of these ; 3. Active principles of them, isolated and purified ; 4. Synthetic products.

Various drugs—male fern, pomegranate, pumpkin seeds, pelletierine and terpenes ; santonin, chenopodium and ascaridol ; phenols, thymol, resorcin, hexylresorcinol ; gentian violet, carbon tetrachloride and tetrachlorethylene and others—each receive a few words on their doses and special uses. A bibliography of nearly 60 titles is appended to the paper. *H. Harold Scott*

DE AZEVEDO, J. F., DA SILVA, J. B., COITO, A. DE M., COELHO, M. F. & COLAÇO, A. O foco português de schistosomiase. [**The Focus of Schistosomiasis in Portugal.**] *An. Inst. Med. Trop.* Lisbon. 1948, Dec., v. 5, 175–222, 20 figs. (15 on 6 pls.) [45 refs.] English summary.

The discovery recently of two cases of urinary schistosomiasis (*S. haematobium*) in the Province of Algarve, at the south-west corner of Portugal, led to an intensive study of the endemicity of this infestation. The authors have carried out a very thorough investigation and their work and its results are presented in much detail in this paper. They give a history of the disease in Portugal, the first case having been reported from the same district in 1921. Some 10 villages were studied, but in only one, Estoi, was infestation found as recently as 1948 ; in one other, Estombar, it was found in 1946, and in a third, Marmelete, in 1942. Molluscs are abundant in the waters of the Province, particularly *Planorbis dufourii*, many of which were infested ; others are *Physa acuta* and *Limnaea peregra*, but these do not seem to be intermediate hosts. In some of the other villages cases have been observed during the past 20 years and there is every possibility that the infestation may spread to them again, since the vectors are numerous and the people infested habitually bathe in local ponds and streams and in irrigation tanks. Experimentally, a Cercopithecus monkey was found infectable by cutaneous penetration of the cercariae and also *per os*, and lesions in the intestine and liver resulted, but on no occasion were ova seen in the urine. Much of this paper is taken up with an ecological study of the molluscan vector. One case, in a man of 21 years, is described fairly fully.

H. Harold Scott

PRATES, M. A bilharziose na Africa Oriental Portuguesa e a sua importância na etiologia dos carcinomas primitivos do figado dos indigenas. [**Schistosomiasis in Portuguese East Africa and its connexion with Primary Carcinoma of the Liver.**] *An. Inst. Med. Trop.* Lisbon. 1948, Dec., v. 5, 149–74, 31 figs. on 10 pls. English summary.

Carcinoma of the liver is unduly common among the indigenous population of the Mozambique. It affects even children as young as 10 years of age, though more frequent among adults of 20 to 35 years. Early symptoms are a feeling of weight and slight pain in the epigastric region or right hypochondrium ; a month or so later swelling appears, often nodular. This is followed by ascites and the fluid may be haemorrhagic ; jaundice appears before death. Cachexia is rapid. At autopsy, the liver shows one or a mixture of four forms : 1. Great

enlargement, to 8 kgm. or even more, with nodules on the surface varying in size from that of a grain of millet to an orange. 2. Liver small and made up of hard tumours like a bunch of grapes. 3. Often seen in children, liver small and cirrhotic with small nodules, resembling Laennec's cirrhosis. 4. One lobe almost entirely replaced by neoplastic tissue, perhaps as large as a " child's head ", with a surface smooth in some parts, nodular in others. The bile-ducts are free of growth but the portal vein is nearly always dilated and occupied by tumour masses.

Seeing appearances so like cirrhosis the author naturally thought of native drinks which are taken freely and are often irritant and contain toxic substances of an aromatic or resinous nature [not specified], but this would not account for many of the cases occurring in children. Further investigation revealed that nearly every individual suffered from schistosomiasis (*S. haematobium* in this district) and microscopical examination of the liver tissues showed that schistosome ova were present, and the author believes that this infestation is the cause of the primary carcinoma common among these people. It was thought that if this were so confirmatory evidence might be obtained by examination of the livers of animals infested with *S. bovis*. The author therefore obtained material from the slaughter-house and found the same histological changes, indicating malignancy, in the livers of cattle similarly infested. Some excellent photographs illustrate the paper. *H. Harold Scott*

DA MOTA, L. A. C.-R. C. Estudo da acção do gamahexano sobre alguns moluscos portugueses dos géneros *Planorbis*, *Limnea* e *Physa*. [**On the Action of Benzene Hexachloride on certain Molluscs of Portugal.**] *An. Inst. Med. Trop.* Lisbon. 1948, Dec., v. 5, 289–319. English summary.

This article is divided into two parts. In the first, the author carried out a comparative study of the effect, under laboratory conditions, of BHC and of copper sulphate on *Planorbis dufourii* (the vector of *S. haematobium* in Algarve Province), *Limnaea peregra* and *Physa acuta*. For the former, he used 10 cc of a solution of a commercial product, L.F.140, containing 10 per cent. gamma isomer, with 90 cc. distilled water and 0·4 cc. of Triton X 100. The copper salt was used in a dilution ranging from one in a hundred million to one in a thousand. The detailed results are given in tables, but the following epitomizes the results :

1. Copper sulphate in a dilution of 1 p.p.m. upwards will kill all three in 24 hours, whereas BHC requires a concentration of 100 p.p.m. to give the same result.
2. BHC is more expensive than the copper salt.
3. BHC may endanger the life of the higher aquatic fauna and animals using the water.
4. *P. dufourii* is more resistant to BHC than are the other two, whereas
5. From a few experiments it would appear that *Planorbis* and *Physa* are both very sensitive to copper sulphate. Hence
6. The copper salt is to be preferred for dealing with *P. dufourii*, the local vector of *S. haematobium* in Algarve.

The second part of the paper deals with the action of BHC on the development of the ova of *P. dufourii*, controls being maintained in water under similar conditions. The author found that with concentrations of 0·1 to 0·2 p.p.m. the motility of the embryos was reduced and the hatching period of the eggs lengthened and all embryos died in 3–4 weeks. In higher concentrations of 1 to 5 p.p.m. they died in 2 weeks and in 10–20 p.p.m. in one week. 0·02 p.p.m. had no effect on the embryos during a period of observation of 35 days. " On account of the very high concentration needed to kill the embryo snails we do not consider the use of gammexane practicable for this purpose."

H. Harold Scott

COUTINHO, J. O. & PESSÔA, S. B. Sôbre um foco autóctone de esquistossomose mansônica em Jacarezinho (norte do estado do Paraná-Brasil). [**A Focus of Schistosomiasis mansoni in Jacarezinho, Paraná.**] *Hospital.* Rio de Janeiro. 1949, Apr., v. 35, No. 4, 531–42, 3 figs. & 1 plan. [14 refs.]

Schistosomiasis mansoni has been recorded in Paraná by Pinto and Almeida, but the exact locality was not given. The authors now report finding a focus of infestation in Jacarezinho, a town in the north of the State. They examined the stools of 51 persons and found ova of *S. mansoni* in 20 of them, all young persons below the age of 20 years ; the ages ranged between 6 and 18 years and all had been born in the town and had lived in the municipality all their lives. The intradermo-reaction was tried on 66 subjects (including the 20 with ova in their faeces) ; 13 gave a 3-plus, five a 2-plus, and eight a 1-plus. Eight of those with faeces positive gave a negative skin reaction and the opposite of this was still more frequent ; four who gave a 3-plus had negative faeces, three who had a 2-plus and seven who had a 1-plus. The chief focus of infection was the stream Agua Feia, near an old reservoir (piscina). *Australorbis glabratus* was found in the waters. Unless care is taken there is a danger of the spreading of the infestation beyond this small focus as conditions therefor are favourable.

H. Harold Scott

NIYAMASENA, S. G. Chromosomen und Geschlecht bei Bilharzia mansoni. [**Chromosomes and Sex in** *Schistosoma mansoni.*] Reprinted from *Ztschr. f. Parasitenk.* 1940, Aug. 30, v. 11, No. 5, 690–701, 17 figs. [Numerous refs.]

GÖNNERT, R. Ueber rudimentäre weibliche Geschlechtsanlagen bei Bilharzia mansoni-Männchen. [**Rudimentary Female Embryos in** *Schistosoma mansoni.*] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1949, Aug., v. 1, No. 2, 272–9, 5 figs. [10 refs.]

GUILLERMO AGUAYO, C. Precisa estudiar mejor nuestros moluscos de importancia medica. [**Need for Closer Study of Molluscs of Medical Importance in Cuba.**] *Rev. Kuba Med. Trop. y Parasit.* 1949, Mar.–Apr., v. 5, Nos. 3/4, 47–50, 3 figs.

The author laments that little, if anything, has been done to gain real knowledge of the molluscan intermediate hosts of the helminthic parasites of his country. *Physa cubensis* and *Limnaea cubensis* are known to be common vectors of *Fasciola hepatica*, and *Tropicorbis havanensis* and *Australorbis glabratus* of *Schistosoma mansoni*. Photographs of these are very clearly reproduced, drawn to scale.

The author suggests publication of a booklet depicting and describing the chief Cuban sweet-water molluscs and indicating their distinctive points for identification ; a study of the geographical distribution, experiments to determine which are capable of acting as intermediate hosts ; to establish malacological and cercarial indices in as many localities as possible, and, finally, to find out the best way of getting rid of potentially nocuous snails. [Much useful information might be gained from the carrying out of such a scheme.]

H. Harold Scott

HIDAYAT, M. A. **Endemic Hepato-Lienal Fibrosis. (Endemic Hepato-Splenomegaly), (Egyptian Splenomegaly).** *J. Roy. Egyptian Med. Ass.* 1949, May, v. 32, No. 5, 404–22. [21 refs.]

This paper is a concise account of the aetiology, pathology and clinical features of Egyptian splenomegaly with a review of 141 patients who were

subjected to splenectomy in the Kasr el Aini Hospital during 1943. The ages of the patients varied from 10 to 70 years, but 94·3 per cent. of them were under 40. There were 120 males and 21 females. The majority came for operation within the first three years of noticing splenic enlargement. All patients showed secondary hypochromic anaemia and it is recommended that operation be postponed until the percentage of haemoglobin has been raised to 70, as in 60 per cent. of the post-operative deaths the figure was below this. Schistosome ova were detected in the stools of 26 per cent. and in the urine of 10 per cent.; if those in whom haematuria and pyuria without ova were present are regarded as probably examples of old schistosome cystitis, then 79 per cent. of the whole series were of schistosomal origin. Thorough treatment of this condition before operation is advised. Ova of *Ascaris lumbricoides* were detected in 33 per cent. and of *Ancylostoma* in 11 per cent., both of which infections received appropriate treatment. Leucopenia below 2,500 or leucocytosis above 11,000 per cmm. should contraindicate splenectomy and an estimation of the number of platelets per cmm. is essential, as there is an increased tendency to haemorrhage in patients with thrombocytopenia, or to thrombosis in the portal venous system in those with a high platelet count. In selecting patients for splenectomy preference should be given to those under 40 years of age with a comparatively short history, the risks of operation increase as the cirrhosis of the liver advances and ascites, jaundice or any sign of hepatic insufficiency are absolute contra-indications. The galactose tolerance often fails to detect mild degrees of hepatic insufficiency; other more sensitive tests are therefore recommended, especially the bromsulphthalein clearance test of Rosenthal, provided that jaundice is absent.

Splenectomy was carried out through a long left paramedian incision in the usual manner; if diffuse firm adhesions are met with or the spleen is felted to its bed the author advises that the attempt at removal be abandoned and as much of the pedicle be ligated as can be safely reached. Silk should be used for all ligatures and auto-transfusion of the citrated splenic blood during the operation is advised. The operation mortality was 10 per cent., due to post-operative shock in five cases, spinal shock (after percaine anaesthesia) in two cases, pneumonia two cases, burst abdomen three cases, cholaemia one case and streptococcal septicaemia one case. Pulmonary collapse and pneumonia occurred in 61 cases (40 per cent.), including the two deaths referred to above; various factors probably contribute to this high incidence, such as trauma to the diaphragm during operation and the loss of the support provided by the enlarged spleen (Henry), but the main factor is obstruction of a bronchus by mucus and inability of the patient to expectorate it as a result of weakness or inhibition of the respiratory muscles. Early movements, cough and expectoration should be encouraged and frequent short inhalations of a mixture containing 5 per cent. of CO_2 in oxygen after operation are advised. [A follow-up of the survivors, with blood examinations where possible would have added greatly to the value of this analysis.] *W. L. Harnett*

Couceiro, A. Esplenomegalia esquistosómica gigante. Esplenectomía. [**Great Enlargement of the Spleen in Schistosomiasis. Splenectomy.**] *Semana Méd.* 1949, July 21, v. 56, No. 29, 115–29, 2 figs. [46 refs.]

This article is of the nature of a lecture on splenomegaly, with an illustrative case of a young girl of 17 years who, from the age of 12, began to suffer from pain and swelling in the left hypochondrium. When she came under the author's observation there was little or no pain, but the spleen extended down to the iliac fossa and two fingers' breadths to the right of the middle line. Eosinophiles made up 10 per cent. of a total leucocyte count of 4,200 per cmm.; in the

faeces were ova of *Ascaris lumbricoides, Ancylostoma duodenale* and *Schistosoma mansoni*. [The author reproduces a photograph of a man with splenomegaly "just like that of the girl in question, because at the time of examining the girl a camera was not available."] Splenectomy was decided upon and a photograph of the organ is shown; its measurements were 30×18×6 cm., weight 2,200 gm. Recovery was uneventful and the patient left hospital in a month.

The remainder of this article is taken up with general text-book matters, such as the physiology of the spleen, enumeration of the causes of splenic enlargement, quotations from and references to the literature on spleens in schistosomiasis, concomitant conditions as regards the blood, urine, liver function, serological reactions and the various reasons for which authors from the beginning of the century have suggested extirpation of the spleen.

H. Harold Scott

ARMBRUST, A. de F. Esquistossomose da vesícula biliar. [**Schistosomiasis of the Gall-bladder.**] *Hospital.* Rio de Janeiro. 1949, Apr., v. 35, No. 4, 467–89, 13 figs. [40 refs.] English summary.

The author remarks on the rarity of involvement of the gall-bladder in schistosomiasis—35 references to it have been collected by him—and he notes that it has been recorded in a patient in Brazil who had undergone the operation of cholecystectomy. He here records two cases of his own. The patients gave a history of repeated haematemesis and died soon after admission to hospital. Varices were found at the termination of the oesophagus. Microscopical examination of the wall of the gall-bladder revealed inflammatory changes and the presence of ova of *S. mansoni*. The pathological changes are well shown in a series of photomicrographs. *H. Harold Scott*

JOPLING, W. H. **The Eradication of Schistosomiasis : a Plea for a Rational Approach to the Problem.** *J. Trop. Med. & Hyg.* 1949, June, v. 52, No. 6, 121–6. [31 refs.]

Much of this paper consists of a review of recent work on mass treatment and methods of snail control, but the author concludes that efforts in these directions are not likely to be effective in control of the diseases. The drugs used are not without danger, or are not so satisfactory that reliance can be placed on them, and the methods of snail destruction can hardly be applied on a scale large enough to cope with what is now an immense problem. The author describes a case in which the patient died a few days after completion of a course of intravenous injections of sodium antimony tartrate in which 10·5 grains were given in two days.

The author's plea for a rational approach is based on the failure of treatment, and of snail eradication by chemical compounds, to control schistosomiasis, and his proposal is that emphasis should be placed on sanitation and education. If proper means for disposal of excreta and refuse were widely available, and the people knew the importance of using them properly, not only would infection of snails be avoided, but the snails themselves, which flourish in contaminated water, would be reduced. [The author makes the point that mass treatment is not likely to be successful in eradicating *S. japonicum* because the animal reservoirs are so numerous. It seems likely that this fact would seriously interfere with the success of any scheme of sanitation, for the same reason.] Good sanitation, of course, would exert its favourable effect on many more diseases than schistosomiasis. *Charles Wilcocks*

HUNTER, G. W., SHILLAM, D. S., TROTT, O. T. & HOWELL, E. V., Jr. **Schistosome Dermatitis in Seattle, Washington.** *J. Parasitology.* 1949, June, v. 35, No. 3, 250–54, 1 fig. [12 refs.]

Swimmers' itch was reported in persons who had bathed in Green Lake, Seattle, and the authors investigated the subject there. They collected four species of snails, and found cercariae of *Trichobilharzia ocellata* (=*Cercaria elvae*) in *Stagnicola palustris nuttalliana*, and cercariae of *Trichobilharzia physellae* in *Physella propinqua*. These two snails are recorded as hosts for the first time, but the other two species could not be incriminated. The known intermediate hosts of these schistosomes are set out in a table :—

Parasite	Common synonyms	Snail hosts
Trichobilharzia ocellata, (La Valette)	*Cercaria ocellata*, La Valette 1855 *C. elvae*, Miller 1923 *Trichobilharzia kossarewi*, Skrjabin and Zakharow 1920	*Lymnaea stagnalis jugularis*, Say *L. s. lillianae*, Baker *L. s. sanctaemariae*, Walker *Stagnicola palustris elodes*, (Say) *S. palustris nuttalliana*, (Lea)*
Trichobilharzia physellae, (Talbot)	*Cercaria physellae*, Talbot, 1936 *Pseudobilharziella querquedulae*, McLeod 1937	*Physella parkeri* (Currier) *P. magnalacustris* (Baker) *P. propinqua*, (Tryon)*

*Denotes a new host record.

The two species of cercariae were proved capable of causing typical schistosome dermatitis by laboratory experiments. In addition, one investigator who was naturally exposed to infection in Green Lake showed severe allergic symptoms on reinfection about one month later, and one who was infected in the laboratory showed a similar severe allergic reaction after natural exposure 27 days later. Sensitivity can therefore be greatly increased after first exposure, but it is not known how specific this sensitivity is to the different schistosomes.

Charles Wilcocks

SILVER, C. P. **Hydatid Cyst and Cirrhosis.** [Memoranda.] *Brit. Med. J.* 1949, Aug. 20, 423, 1 fig.

This case refers to a woman of 68 who was admitted to hospital in Edgware, vomiting blood and in a semi-conscious condition. She had lived all her life in Lancashire and was not an alcoholic. She had had two abdominal operations in early life and a third in 1931 : the only notes available stated " laparotomy —hydatid cyst ". She had a haematemesis in 1944 and recovered. Despite treatment, she died 36 hours after admission. Autopsy showed evidence of multilobular cirrhosis and the right lobe was replaced by a cavity, 18 cm. in diameter, which contained turbid fluid. The walls consisted of a layer of fibrous tissue, compressed liver tissue and a shaggy inner surface [illustrated in a photograph]. There was no calcification. Microscopically, the vascular collagenous cyst wall showed no liver parenchyma.

The thick-walled cyst had existed for many years, but had distended instead of becoming shrunken and calcified.

The rarity of this combination in the literature is briefly discussed, but the author suggests that it seems unlikely that the cyst and the cirrhosis were present together by chance. This cyst was almost certainly hydatid in origin and had probably existed since childhood: the great age of the cyst and its persistence after the death of the parasite may have had a bearing on the development of cirrhosis. *H. J. O'D. Burke-Gaffney*

CRIVELLARI, C. A. & MARTÍN MENDY, R. Profilaxis de la hidatidosis en la república Argentina. [**Hydatidosis Profilaxis in Argentina.**] *Bol. Oficina Sanitaria Panamericana.* 1949, June, v. 28, No. 6, 554–7. English summary.

DÉVÉ, Felix. **L'échinococcose osseuse.**
——. **L'échinococcose primitive. (Maladie hydatique.)**

These books are reviewed on pp. 1099–101.

DE AZEVEDO, J. F., ROQUE, R. DE A., COLAÇO, A., CRISTINO, E., RÉS, J. F. & COELHO, M. F. A ancilostomíase rural em Portugal. [**Rural Ankylostomiasis in Portugal.**] *An. Inst. Med. Trop.* Lisbon. 1948, Dec., v. 5, 31–69, 12 figs. [14 refs.]

The English summary appended to the paper is as follows :—

" 1. Ancylostomiasis is still existing in Portugal as a rural autocthonous entity, infesting a large area in the suburbs of Coimbra (center of Portugal).

" 2. This parasitosis is spread in some localities of the region, among which Vilarinho, 66·5% of the population is infested causing sometimes severe anemias,

" 3. The *Ancylostomidae* although more frequent among children from 5 to 10 years old were found in one child aged 16 months and in an old man aged 80 years ; the boys are more affected than the girls and they show lower rates of hemoglobin.

" 4. The infestations are mild in the majority of cases and as maximum, one case with 276 worms was found.

" 5. Besides *Ancylostomidae* the *Ascaris lumbricoides* and *Trichocephalus dispar* infest also largely the local populations.

" 6. The characteristics of the region, such as temperature, rainfall, nature and hydric richness of the soil, irrigation system of the land and its methods of cultivation, are favourable nearly all around the year to the evolution of the eggs of *Ancylostomidae* and to the longevity of the infesting larva.

" 7. The precarious hygienic habits of the populations and its agricultural occupation contribute largely to the maintenance of the endemic focus.

" 8. The gravity of the manifestations of Ancylostomiasis per se, the character of malignity it transmits to the intercurrent diseases, the economic deficit it certainly conveys to the parasitized populations and the possibility of the spread of this disease from this focus to other regions of the country, urges its extermination. We advise as a prophylactic base the treatment of all patients during the winter season."

VOGEL, H. & MINNING, W. Beiträge zur Klinik der Lungen-Ascariasis und zur Frage der flüchtigen eosinophilen Lungeninfiltrate. [**Communication on Pulmonary Ascariasis and Transient Pulmonary Eosinophilia.**] Reprinted from *Beiträge z. Klin. d. Tuberkulose.* 1942, v. 98, No. 8, 620–54, 15 figs. [34 refs.]

The authors prevailed upon six volunteers, between the ages of 30 and 49 years [there is no indication of their being prisoners of war] to swallow a certain number of ova of *Ascaris lumbricoides* with a view to determining what clinical

symptoms and X-ray appearances (if any departure from the normal) and blood and sputum changes occurred ; whether the clinical picture corresponded with an eosinophilia, and how many ova were needed to produce these symptoms. The numbers of ova swallowed varied from 6 to 45. Nine to twelve days after the ingestion, the X-rays revealed slight pulmonary shadows reminiscent of a mild bronchitis and lasting for three to six days. This was accompanied by a feeling of faintness, pain in the joints, headache, a little breathlessness and a dry cough. Those who had taken the larger amounts, 21 and 45 ova, had higher fever and some crepitations in the lungs. Expectoration was slight, greyish-yellow in colour and microscopically showed some red corpuscles, Charcot-leyden crystals and eosinophiles, but no *Ascaris* larvae. The degree of eosinophilia varied ; in two of the subjects it was very low, but in one who had taken 45 ova eosinophiles comprised 38 per cent. of a total leucocytosis of 10,600 per cmm. on the 18th day, 52 per cent. of 10,800 on the 20th, and 36 per cent. of 8,600 on the 23rd day. Together with the lung symptoms, signs of allergy were noticed : urticaria, pruritus and facial oedema. It is argued that *Ascaris* larvae may be a cause of Loeffler's syndrome. [This contribution was received by the Journal in question in July, 1942, but even then it was known that the larvae of *Ascaris* in their development passed through the lungs and that, apart from a general eosinophilia, the presence of worms or their ova was associated with local eosinophilia. See also this *Bulletin*, 1949, v. 46, 871.]

H. Harold Scott

GUHA, P. K. **An Interesting Case of Round Worm Infection with Post Mortem Report.** *Calcutta Med. J.* 1949, Apr., v. 46, No. 4, 115.

A young Madrasee of about 25 was admitted to a hospital in Bangalore in 1944 with abdominal pain and vomiting of three days' duration. Three times in hospital, he vomited 30 to 40 roundworms. Despite general and supportive treatment, he died a few hours later. At autopsy " handfuls " of roundworms were emerging from the nose and mouth. There was no sign of peritonitis, but there was a rent of 3½ inches in the greater curvature of the stomach ; nearly 200 roundworms were projecting from this opening. Two pockets of roundworms were found in the liver, and one each in the pancreas and the spleen.

It is suggested that the marked under-nutrition and low resistance of this patient played a part in the dissemination of the parasite in these three organs.

H. J. O'D. Burke-Gaffney

GURTNER, H. Toxische und antigene Eigenschaften von Ascaridenextrakten. [**Toxic and Antigenic Properties of** *Ascaris* **Extracts.**] *Ztschr. f. Hyg. u. Infektionskr.* 1948, Aug. 17, v. 128, Nos. 3/4, 423–39. [28 refs.]

The varied character of the symptoms due to *Ascaris*—diarrhoea, vomiting, cramps, and urticaria, conjunctivitis and asthma indicating allergy—is in favour of there being not one single toxin but a combination of them. The author obtained specimens of *Ascaris suis* and prepared four extracts therefrom : Complete extract, protein, carbohydrate and lipoid. Minute details of the preparation are given in the paper ; those interested should turn to the original, the account is too full for reproduction here. They were then tested by subcutaneous injection into guineapigs and rabbits. The first three were dissolved in physiological saline, the fourth in sterile neutral olive oil. The former three were injected in quantities of 1, 2 and 2 cc. at intervals of three and two days respectively, the lipoid extract intragluteally in doses of 0·5, 1·0 and 1·0 cc. at the same intervals. The strongest reactions produced were red or pale

papules 6–9 mm. in diameter, visible in 24 hours and remaining for nine days or longer. Complement fixation reactions were also carried out with the sera of immunized rabbits.

Cutaneous tests were also made on 12 human subjects ; seven with a clear history of *Ascaris* infection, three doubtful and two negative. The results of all these tests, animal and human, are given in a series of protocols, but may be epitomized as follows : The protein and complete extracts were more potent for guineapigs than the other two and the protein more than the complete. Injected intravenously both are rapidly fatal. Both contain a " histamine-like substance," but it is not histamine itself. Intracutaneously injected into rabbits, the complete extract and the lipoid fraction were more toxic than the carbohydrate fraction and the latter more than the protein fraction. Complement fixation tests showed that all four extracts possessed antigenic properties. In cutaneous tests on the human subject the protein fraction proved to be the most active and after it in order the complete extract, the lipoid fraction and, least, the carbohydrate fraction. *H. Harold Scott*

KOZAR, Z. **Age-Acquired Resistance and the Influence of Diet and Light on the Parasite** *Ascaridia columbae* **in Pigeons.** *Bull. Inst. Marine & Trop. Med., Med. Acad., Gdansk, Poland.* 1948, v. 1, No. 1, 39–44.

HAFEZ, A. H. **Localised Filarial Mass of the Breast simulating Carcinoma.** *J. Roy. Egyptian Med. Ass.* 1949, May, v. 32, No. 5, 429–33, 1 fig.

A widow aged 50 had noticed a painless mass in the upper outer quadrant on the left breast for 15 days. The skin of the affected breast was tougher and thicker than that of the other breast, the mass was firm, irregular in outline and fixed in the breast substance, adherent to the skin, but not to the underlying muscles. The axillary nodes on the same side were enlarged, not tender and not adherent to each other or to the surrounding structures. There were no other physical signs. Scirrhous carcinoma of the breast was diagnosed and operation advised, which was refused but a biopsy under local anaesthesia was allowed. The mass had the naked eye appearance of carcinoma, but microscopy showed a granuloma containing foreign bodies, which on serial section proved to be portions of a filaria. Subsequent enquiry elicited that the patient lived in a district heavily infested with filaria [unspecified], but had never suffered from lymphangitis or other filarial manifestation. No microfilariae were found in the blood. In Egypt filariasis of the breast usually gives rise to diffuse elephantiasis and no report has hitherto been made of a localized mass simulating carcinoma. *W. L. Harnett*

GALLIARD, H. & MILLE, R. Essais de traitement de la filariose à *Wuchereria bancrofti* var. *Pacifica* par le l-diéthyl carbamyl, 4-méthyl pipérazine, à Tahiti. [**Studies in the Treatment of Filariasis due to** *W. bancrofti*, **var.** *pacifica* **by 1-diethylcarbamyl 4-methyl piperazine in Tahiti.**] *Bull. Soc. Path. Exot.* 1949, v. 42, Nos. 5/6, 304–13.

Six patients in Tahiti were given 2 mgm. per kgm. of Hetrazan by mouth three times a day for 7 days. The number of microfilariae in the blood fell very rapidly so that within six hours 70–90 per cent. had already disappeared. For 96 other patients the dose was only 25 mgm. thrice daily for 4 days and 50 mgm. thrice daily for 3 days (owing to shortage of supplies) : 87 per cent. were free from microfilariae at the end of treatment and the others showed great reduction in the microfilarial count. Sixty-five patients were followed for 4 months : 47 per cent. showed slight relapses (1–10 microfilariae per 20 mm.),

14 per cent. showed heavy relapses and 15 per cent. remained free from microfilariae. An attempt was made to treat some patients with single daily doses (? 4 mgm. per kgm.) but the reactions were too severe and the sterilization was less complete. The treatment is well tolerated and even if reactions do occur in carriers of microfilariae they do not necessitate interruption of treatment.

As regards *general reactions* :—The most common symptom is fever, which is usually moderate (37·8–38·5°C.) and which comes on at end of the first day, lasting only a day or two. Aches in the head, loins and joints, rigors and tinnitus may also occur. Two cases of benign epistaxis were seen. As regards *reactions of special systems* :—Nausea was common. Vomiting occurred only in three subjects, who each expelled many *Ascaris*. Pruritus was common ; in three patients there was an intense bullous eruption localized in one of the superior members. These skin reactions are probably allergic reactions due to the destruction of worms. The circulatory and urinary systems were not affected. In some cases there was painful enlargement of the epitrochlear gland or a lymphangitic crisis, which might be interpreted as due to the death of adult worms. [These reactions differ in many ways from those of patients with *W. bancrofti* treated in East Africa ; the difference may be due to the different variety of filaria involved.] A pronounced eosinophilia occurred after an initial fall. Examinations of the blood suggested that there might be an increase in the proteins of the plasma.

Experience with patients showing clinical symptoms of filariasis is limited. In five early cases of filariasis with lymphangitis, pain subsided quickly but the signs of inflammation receded more slowly. Other cases of lymphangitis in older patients were also treated but the results were too variable to allow of definite conclusions being drawn. One case of lymph scrotum cleared up well under treatment. In haemato-chyluria no permanent effect was produced. It is noted that cases of acute lymphangitis due to filariasis responded very quickly to benadryl or neo-antergan 50 mgm. 3–4 times daily for 2–4 days ; this supports the view that such lymphangitis is allergic in origin.

It seems potentially possible by combining the destruction of microfilariae with the destruction of mosquitoes to prevent the constant reinfestation which occurs in Oceania. *F. Hawking*

HAWKING, F. & LAURIE, W. **Action of Hetrazan on Filariasis and Onchocerciasis.** *Lancet.* 1949, July 23, 146–7.

Hetrazan, 1 mgm. per kgm. body weight twice daily or 0·5 mgm. per kgm. thrice daily, removed most microfilariae of *Wuchereria bancrofti* from the blood of man ; smaller doses did not clear the blood. Larger doses, 12–20 mgm. per kgm. daily, cleared the blood usually in three days or less, but rarely a few embryos persisted during the whole of the observation period, which was three months. A single dose of 20 mgm. per kgm. sufficed in most patients to remove most of the embryos. After giving the drug by mouth in the evening when the microfilarial tide was rising, 60–80 per cent. of the embryos disappeared from the blood within half an hour ; and after the drug was injected intravenously, 60 per cent. of the embryos disappeared in four minutes. On the other hand, embryos lived for several days *in vitro* in contact either with solutions of the drug or with serum from a patient who had received the drug an hour previously ; furthermore, embryos persisted in the fluid of hydroceles in patients whose blood had been rendered free from microfilariae by treatment with the drug and in hydroceles into which the drug had been injected. It seems, therefore, that the drug is neither directly toxic to the microfilariae nor does the body change it into a filaricidal substance. It is suggested that the observations support the hypothesis that the drug acts by sensitizing the microfilariae for phagocytosis

by the reticulo-endothelial system to which they are exposed in the blood stream. It is implied that the embryos do not come into contact with large phagocytes in serous cavities and therefore are not destroyed.

Owing to allergic reactions, small doses of drug were used against onchocerciasis, a common dosage being 50–100 mgm. per patient [presumably about 0·75–1·5 mgm. per kgm.] twice daily for the first two days and thereafter 150–600 mgm. twice daily ; with this dosage embryos sometimes disappeared from the skin after 2–3 days but in other cases persisted for more than 10 days despite continued treatment. Active adult worms were found in nodules excised from 5 of 7 patients who had had 5–12 mgm. per kgm. per day for 13–27 days, and active embryos were found in the nodules of all the seven patients. The maximum tolerated single dose of Hetrazan for man appeared to be about 20 mgm. per kgm. body weight. In patients with *W. bancrofti* this sometimes caused nausea and vomiting, with or without epigastric pain, and occasionally produced tender spots in the groin or scrotum. In patients with *Onchocerca*, even a single dose of 50 mgm. [presumably less than 1 mgm. per kgm.] always produced a violent reaction which was well marked in 16 hours. There was usually swelling, oedema, itching and tenderness of the skin, with sometimes a papular rash, and enlargement and tenderness of the lymph glands ; and always pyrexia up to 101–102°F. The symptoms subsided after a few days and the patients could then tolerate much higher doses, *e.g.*, 12 mgm. per kgm. daily. The severity of the reaction seemed proportionate to the number of embryos initially in the skin. The authors feel that this allergic reaction is sufficient to make Hetrazan unpopular were it to be used for the mass treatment of onchocerciasis. [These allergic reactions seem to be a feature of the treatment of filariasis with Hetrazan and to be especially marked in onchocerciasis. It seems worth while endeavouring to diminish their severity by the use of sedatives and anti-histamine drugs.] *F. Murgatroyd*

BRYGOO, E. Essai de traitement de la filariose (*F. loa* et *F. perstans*) par le 3·799 R.P. [**Therapeutic Trial of 3,799 R.P. on Filariasis due to *Loa loa* and *Acanthocheilonema perstans*.**] *Bull. Soc. Path. Exot.* 1949, v. 42, Nos. 5/6, 313–17.

The studies were carried out in the region of Ayos in French Cameroons : 3,799 R.P. is Hetrazan, *i.e.*, 1-diethyl carbamyl-4-methyl piperazine. Five patients infected with *Loa loa* and *A. perstans* were treated with doses up to 5 mgm. per kgm. twice daily. Microfilariae of *L. loa* were removed from the blood ; those of *A. perstans* diminished or disappeared but the author does not attach great significance to this. During the discussion on this paper, Stefanopoulo described a case of onchocerciasis in a European, in whom the allergic reactions to Hetrazan had been so violent (in spite of anti-histamine drugs) that the patient had refused to continue the treatment. *F. Hawking*

KOHLER, C. E. ; BROWN, H. W. ; WILLIAMS. R. W. **Filariasis Control by DDT Residual House Spraying, Saint Croix, Virgin Islands. I. Operational Aspects** [KOHLER, C. E.]. *Pub. Health Rep.* Wash. 1949, July 8, v. 64, No. 27, 857–62. **II. Results** [BROWN & WILLIAMS]. *Ibid.* 863–75, 1 fig.

DDT applied to houses as a residual spray has been used with success in the control of adult anophelines in different parts of the world and very effectively in South America for the elimination of *Aëdes aegypti*. *Culex quinquefasciatus* (*fatigans*) appears to have been less susceptible to DDT ; but its importance in the Caribbean region as the vector of Bancroftian filariasis led to the United States Public Health Service introducing the residual insecticide method to

the local authority of the island of St. Croix (84 sq. miles) one of the American Virgin Islands group situated to the east of Porto Rico in the West Indies. For all practical purposes the mosquito population appears to be limited to *Culex quinquefasciatus* and *Aëdes aegypti*, both domestic types breeding in artificial containers of water or in polluted waters closely associated with human dwellings.

A team of local workers was trained to apply insecticide in the usual way by power sprayer, hand sprayer or both at the rate of 200 mgm. DDT per square foot to walls, ceilings, porches and privies of housing of the typical sub-standard type, characteristic of a tropical country and in keeping with the low economic level of the inhabitants. At first DDT in kerosene was used, but this was soon replaced by DDT-Xylene-Triton emulsion [35 per cent. DDT-Xylene concentrate, with Triton X-100, diluted with water to form a 5 per cent. spray]. Spraying began in October 1946 and finished in May 1948, each dwelling on the island having been treated on four occasions. Continuation of the process was then handed over to the local health department as a "going concern" with the proviso that wettable powders might well be substituted for the emulsions because of the absorbent nature of the wall surfaces. A table provides the detail of work, man-hours and cost, all of which improved as the workers gained experience. In all, 11,078 houses (1,900 sq. ft. per house) were sprayed, each on four occasions, in 400 working days or 21,630 man-hours at a cost at the last spraying of approximately 1½ dollars per house.

The School of Public Health of Columbia University took the opportunity of ascertaining the effectiveness of this campaign in reducing the transmission of *Wuchereria bancrofti*. Mosquito and blood surveys were conducted before and after the 20-month period of spraying.

The mosquito survey revealed only *C. quinquefasciatus* and *Aëdes aegypti* in human dwellings; samples of these were collected from the whole island and conveyed to a central laboratory for dissection. The filaria infection rates are tabulated. In 1946, 2,244 *C. quinquefasciatus* had an infection rate of 7·9 per cent., and 0·40 per cent. contained infective forms of the parasite. In 1948, only 846 *C. quinquefasciatus* were collected, of which 3·65 per cent. were found to contain developing forms of the filaria but no infective forms were observed. Of 867 *Aëdes aegypti* caught in 1946, 2·3 per cent. contained developing forms but no infective ones, while in 1948 no *Aëdes aegypti* were seen in houses. The end result revealed a 57 per cent. reduction in the number of houses harbouring *C. quinquefasciatus* with a 50 per cent. reduction in the percentage of infected mosquitoes; in all probability survivors did not live long enough to become infective; *Aëdes aegypti* seemed to have disappeared.

Blood surveys for microfilariae were conducted before the DDT programme and 21 months later. Thick blood films were made from pre-school and school children; of 1,311 examined in 1946, those aged 6 years were the youngest to show infection (6·2 per cent.); the rate gradually increased with age, the maximum being 25·5 per cent. in those aged 13 years. The counts varied from one to 741 microfilariae per 0·04 ml. of blood in the 13·3 per cent. found infected. The 1948 survey of 906 children gave an infection rate of 10·6 per cent., the difference being "not quite statistically significant." However, the percentages positive in those aged 6, 7 and 8 years were considerably reduced, 6·2 to 2·9, 8·9 to 3·5 and 11·9 to 6·7 respectively. Despite variation of microfilaria counts in the same person from day to day, the authors believe that counts in groups of individuals do give an approximation of the degree of infection; the average microfilaria count for all examined fell from 74·1 in 1946 to 45·8 in 1948, the difference again "not quite statistically significant." Of 504 children examined on both occasions, 454 were negative; of the positives, 20 showed increases and 30 decreases in microfilaria counts.

As the authors point out, " the microfilaria count of a long-lived infection such as *W. bancrofti* will be affected very slowly by the prevention of additional infection," and it seems unfortunate that the promising results obtained can be checked no further as another research group are attempting control of filariasis by treatment of all persons on the island. *R. Ford Tredre*

BRUMPT, L. C. Présence de *Mansonella ozzardi* chez une femme de la Guadeloupe. [*Mansonella ozzardi* **in a Woman in Guadeloupe.**] *C. R. Soc. Biol.* 1949, Apr., v. 143, Nos. 7/8, 468–9.

MAUZÉ, J. Filariose et tuberculose pulmonaire. [**Filariasis** (*Mansonella ozzardi*) **and Pulmonary Tuberculosis.**] *Bull. Soc. Path. Exot.* 1949, v. 42, Nos. 1/2, 25–6.

The author describes a patient, a native of Guadeloupe who had returned there after having spent four years in Paris as a medical student. On his return to Guadeloupe he had a severe haemoptysis and it was on this account that he sought advice. In a specimen of his sputum examined by direct smear there was a perfect microfilaria of *Mansonella ozzardi*, presumably present in the blood in this specimen, and tubercle bacilli were also found. The filarial infection, which had not previously been diagnosed, was probably acquired before he first went to France, because the period since his return (3 weeks) was hardly enough for development ; if that was so, residence for 4 years in a temperate climate evidently had little effect on the filarial infection.

In the discussion of this paper DESCHIENS referred to the general subject of parasitic diseases which produce eosinophilia, in relation to tuberculosis, noting that in certain investigations the incidence of tuberculosis was lower in groups of parasitized people than in those not parasitized. The eosinophilia may be a sign of a state of allergy which may itself tend to inhibit tuberculous infection. *Charles Wilcocks*

TORRES MUÑOZ, A. Control de oncocercosis. [**Onchocerciasis Control.**] *Bol. Oficina Sanitaria Panamericana.* 1949, June, v. 28, No. 6, 558–68. English summary.

FLOCH, H. & DE LAJUDIE, P. Sur vingt-huit microfilaires animales en Guyane Française. [**Twenty-Eight Forms of Microfilarie in Animals in French Guiana.**] *Institut Pasteur de la Guyane et du Territoire de l'Inini. Publication No. 53.* 1942, Sept., 30 pp., 5 pls. [21 refs.]

FERREIRA, F. C. & LOPES, E. M. R. Aspectos clínicos e epidemiológicos dum foco endémico de dracontíase na Guiné Portuguesa. [**Clinical and Epidemiological Aspects of a Focus of Dracontiasis in Portuguese Guinea.**] *An. Inst. Med. Trop.* Lisbon. 1948, Dec., v. 5, 71–86, 23 figs. on 13 pls. (1 map). English summary.

A very clear account of dracontiasis as it affects five villages in the Susana district at the north-west of Portuguese Guinea. The inhabitants of these villages total 1,011. Of these, 792 were examined and 186 (23·5 per cent.) were harbouring the worms, and 28 of these had more than one. To compare the percentage infection in the different villages might convey a wrong impression because the population and the numbers in each village who were examined varied so widely. Thus, in Cassolol, with 583 inhabitants, 486 were examined and 100 found infested, 8 of them with multiple infestation ; this gives a percentage of 20·6. At Caruai, at the other extreme, there were 59 inhabitants,

25 were examined, 9 were positive, 7 with one and 2 with more than one worm. This is given as 36·0 per cent. infestation. Looked at thus, Tanhate with 88 inhabitants showed the highest rate, for of 68 examined 33 were positive (48·8 per cent.), 8 of them with multiple infestation. Of the total 792, 197 were children [age not stated] and 36 (18·3 per cent.) of them were positive ; 595 were adults and 150 (25·2) were positive. Many more adult males were infested than females ; 98 out of 288 males (34·0 per cent.), 52 out of 307 females (16·9).

During the incubation period, *i.e.*, the time between ingestion of the embryo and appearance of the worm, 10–14 months, there may be no symptoms, but a few hours before the worm makes its appearance there may be local erythema and oedema, with pruritus and even generalized urticaria, dyspnoea and asthmatic attacks, nausea, vomiting, vertigo or syncopal attacks and nervous symptoms such as delirium or mental confusion, but these are not common. The site where the worm appears was noted in 201 instances : In the upper limb 8 (shoulder 1, upper arm 3, forearm 1, hand 3) or 3·9 per cent. ; in the lower limb 182 (90·5) groin 1, thigh 15, knee 13, leg 90, foot 63), and in the trunk 11 (5·5) (in the lumbar region and flank 2 each, the abdominal wall 7). These are well illustrated in a series of photographs. Synovitis and arthritis are fairly common complications and cysts of embryos may appear (these are also depicted). The crustacean host is *Mesocyclops leuckarti* subspecies *aequatorialis*, but *Daphnina* is also very common. The usual prophylactic measures are mentioned : Prohibition of those infested bathing in waters which may be used for drinking, and purification of drinking water contaminated by possibly infected crustacea. *H. Harold Scott*

DAENGSVANG, S. **Human Gnathostomiasis in Siam with reference to the Method of Prevention.** *J. Parasitology*. 1949, Apr., v. 35, No. 2, 116–21, 4 figs. [15 refs.]

Gnathostomiasis has been reported in many countries in the Far East, but the largest number of cases have been from Siam. The author adds 17 more Siamese cases ; the subjects, who were patients in the Siriraj Hospital Bangkok, were all women except two and were aged 18 to 80 years. The parasite, *Gnathostoma spinigerum*, was identified in each case.

The author has divided his cases into 5 clinical groups according to the tissue or organs into which the worms finally migrated. In nearly every case there was a primary phase of migration in the skin or subcutaneous tissues. The lesions were usually itchy, tender and painful ; the pain was of a pricking or boring nature. There was no local oedema or pitting. Fever was usually absent. Eosinophilia was almost constant ; it varied from 5 to 73 per cent.

Attacks usually lasted up to 10 days but were sometimes prolonged for a month or more, and they recurred up to six times a year. The duration of the infection varied ; in one case it was three years. The infection terminated spontaneously by the rupture of mature or immature worm through the skin or mucous membrane. In other cases the worms were removed surgically.

Group 1 consisted of 6 patients in whom the swellings were mainly on the chest and abdomen ; the worm did not migrate beyond the skin or subcutaneous tissues.

Group 2 consisted of 3 patients on whom the migration reached the neck and face, and involved the eyelids and eventually the eye itself. In each case a worm was removed from the eye, in two from the iris and in one from the anterior chamber. ne morning

Group 3 consisted of 3 patients who had otions are gums after a period of cutaneous migrations. In each case a worm *H. J.* entually coughed up,

after which the symptoms subsided. In one case there was a period of meningeal irritation with semi-consciousness lasting 7 days.

Group 4 consisted of 4 patients who after suffering periods of cutaneous migration of the worms developed movable abdominal tumours. The tumours grew slowly and were tender, but there were no other symptoms. At laparotomy a smooth rounded hard tumour of the omentum adherent to the ileo-caecal part of the intestine was removed in each case. The tumours were all about 5 cm. in diameter and in each a gnathostome was found in the centre of a necrotic space.

The last group consisted of one patient in whom the worm eventually presented in the soft palate.

The author refers to additional cases in which there were symptoms of haematuria and leucorrhoea when the worms migrated into the bladder and uterus, respectively.

Antimonials have proved of uncertain use in this infection. Surgical removal of the worm is the only treatment.

The life cycle of this worm is reviewed [see this *Bulletin*, 1933, v. 30, 711]. The worms are normally found in the stomach wall of cats and dogs. The eggs pass into the bowel lumen and are excreted. A free-living larva emerges. The first-stage larva is ingested by a cyclops in which the second stage larva develops. When the cyclops is ingested by a fish, the worm develops further and is surrounded by a cyst wall. Transmission to the natural definitive hosts and to man occur through the eating of the infected fish. The infective larva takes 6½ months to develop into an adult ; the whole cycle takes 8 months.

A common medium of infection is a fermented food made mainly of fresh-water fish available in the local markets in Siam. Women are particularly fond of this food. The larvae are killed by boiling for 5 minutes or by leaving in vinegar (4 per cent. acetic acid) for 5½ hours. They, however survive 4°C. for a month.

L. E. Napier

CHEN H. T. **A Human Ocular Infection by** *Gnathostoma* **in China.** *J. Parasitology*. 1949, Aug., v. 35, No. 4, 431–3. [23 refs.]

Worms of the genus *Gnathostoma* sometimes cause skin or subcutaneous infections in man [this *Bulletin*, 1949, v. 46, 857]. The author summarizes 29 proved cases up to 1947, together with the literature concerning this infection in man and animals in the Far East.

With three exceptions, all species identified have been *G. spinigerum*. One recorded from Japan was *G. hispidum* [this *Bulletin*, 1924, v. 21, 560] and two from India did not appear to belong to either species [*ibid.*, 1930, v. 27, 984 ; 1945, v. 42, 919].

The present case refers to a native of Canton, aged 45, who had a gnathostome worm lying on the iris in the anterior chamber of the left eye : the worm was successfully extracted. This is the third recorded ocular gnathostomiasis, the others having been reported by MUKERJI and BHADURI and SEN and GHOSE, both in Bengal in 1945 [*ibid.* 919 ; 1946, v. 43, 576].

The worm in this case was in an immature form 2·54 mm. long and 0·40 mm. wide. A detailed description of its morphology and measurements is given. Because of the nature of the cephalic hooklets and the extent of the body spines, it has been tentatively identified as *G. hispidum*. The disputed question of the manner of human infection is discussed and the author thinks it likely that his patient may have been infected by eating raw fish delicacies which are popular among certain classes in Canton.

It is suggested that human gnathostomiasis may sometimes be wrongly diagnosed or easily overlooked, because of its rarity.

H. J. O'D. Burke-Gaffney

WALKINGSHAW, R. **A Subcutaneous Migrating Embryo.** *Med. J. Malaya.* 1949, June, v. 3, No. 4, 264.

This would appear to be the same case of gnathostomiasis as that recorded by SANDOSHAM [this *Bulletin*, 1949, v. 46, 857] but the finger affected, the colour, dimensions and name given to the worm differ in the two papers.

H. J. O'D. Burke-Gaffney

MARTELLI, T. & ZAFFINO, C. Sulla frequenza dell'infestazione da Oxyuris vermicularis nell'eta' infantile. [**Incidence of** *Enterobius vermicularis* **Infestation in Infants.**] *Ann. d. San. Pubblica.* Rome. 1949, Mar.–Apr., v. 10, No. 2, 370–75, 4 figs. English summary (3 lines).

The authors, after quoting figures from the literature of several countries on the prevalence of *Enterobius* infestation among children, record their own findings among 220 children examined by them in a district of Rome. They used the "Cellophane" swab method. The children, both boys and girls, were of all social grades and their ages ranged between 2 and 12 years. Seventy-four were positive. Though commonest among those of school age, infestation was also found in the very young, 2–5-year-olds. They note that the ova have been found not only in the infants themselves, but on their clothes, sheets, bedding and even on the window-sills of the rooms, so that infestation may be dust-borne [as is well known]; also that there are probably adults harbouring the worm and acting as chronic carriers. Besides the pruritus, insomnia and fretfulness, the infestation may cause various other disturbances—pallor, loss of weight, poor appetite, masturbation, leucorrhoea—and, in adults, nymphomania.

H. Harold Scott

BROOKE, M. M., DONALDSON, A. W. & MITCHELL, R. B. **A Method of supplying Cellulose Tape to Physicians for Diagnosis of Enterobiasis.** *Pub. Health Rep.* Wash. 1949, July 15, v. 64, No. 28, 897–901, 2 figs.

The authors describe a modification of the Graham cellulose-tape technique [this *Bulletin*, 1941, v. 38, 525] which can readily be made available to physicians and can be used by members of a patient's family.

To one end of a strip of clear, transparent cellulose tape ($\frac{3}{4} \times 4$ in.) is stuck a piece of paper $\frac{3}{4} \times \frac{1}{2}$ in. The tape is pressed to a clean slide (1×3 in.) and looped over the end so that a small portion adheres to the under surface of the slide. The paper serves as a tab for lifting the tape. The preparation may be mailed in a slide container.

For use, the longer strip of cellulose tape is lifted from the slide by means of the paper tab: the section thus freed is looped over to expose the gummed side, which is then made to touch the perianal region several times. The tape is then replaced on the surface of the slide, where it can be examined directly with a 16-mm. objective for the presence of *Enterobius* eggs.

Experiments on the keeping power of cellulose-tape preparations are described. Those placed in slide containers and stored at room temperature maintained their adhesiveness and clear transparency for over 7 months, while those kept in a refrigerator or exposed to direct sunlight deteriorated. Large numbers of these slide preparations may therefore be prepared in inexpensive kits suitable for distribution to physicians by public health laboratories: and parents can be instructed in taking the specimen in the home at a time most favourable for recovering the eggs, *e.g.*, at bedtime or in the morning before there has been a bowel movement or a bath. Detailed descriptions are given in the paper and are well illustrated with clear line drawings.

H. J. O'D. Burke-Gaffney

WIGAND, R. Therapeutische Diarrhoen zur Beseitigung der Enterobiasis vermicularis. [**Therapeutic Diarrhoea for** *Enterobius vermicularis* **Infestation.**] *Med. Klin.* 1949, Jan. 14, v. 44, No. 2, 51–2.

According to Schüffner the length of life of *Enterobius vermicularis* ranges from 37 to 93 days. As soon as the ovary becomes packed with eggs the worm looses her hold on the intestinal wall and lies passive in the faecal stream. The author assists the passage to the exterior by giving saline purgatives, Glauber, Karlsbad or Epsom salts, which are taken in warm water when the patient is fasting. The result must be definitely watery stools and not merely loose, diarrhoeic stools, so that the fluid may act " like a cataract." This treatment may be given twice in a week, but the purging should not last more than the one day; and in 5 weeks the patient is usually free from worms.

H. Harold Scott

ERRATUM

In the abstract of the paper by HALAWANI *et al.* [this *Bulletin*, 1949, v. 46, 753] the symbol " mgm." should read " μgm." in the following positions :

Para. 1, lines 14 and 17.
Para. 2, lines 9 and 10.

DEFICIENCY DISEASES

VALLOTTON, M. Zur pathologischen Anatomie der B_1-Avitaminose (Myokard- und Duraveränderungen im Rattenexperiment). [**Pathological Anatomy of Avitaminosis B_1.**] *Internat. Ztschr. f. Vitaminf.* Berne. 1949, v. 21, No. 1, 61–83, 5 figs. [47 refs.]

The English summary appended to the paper is as follows :—

" Similar changes are produced in the dura mater of the rats after deficiency of long duration of vitamin B_1, as described in men before and in the beginning stages of the chronic haemorrhagic internal pachymeningitis. They are : dilatation, hyperaemia and increase of the capillaries with formation of sprouts and close loops in surrounding places, light deposits of haemosiderin, loosening of the connective tissue. Trauma causes only bleeding which is of importance to the progression of the illness. Further widening and hyperaemia show the capillaries of the myocardium. The sarcolysis as described by Wenckebach as classic phenomenon of deficiency of aneurin is found in the muscles of the heart walls. When the illness is of long duration, the focal muscular lesions are apt to get confluent and to be transformed in connective tissue. The decomposition of the fibrils can be only attributed to the lack of vitamin B_1, because the food of animals contains all the other necessary components, especially proteins in sufficient quantity."

BEAN, W. B., VILTER, R. W. & BLANKENHORN, M. A. **Incidence of Pellagra. Studies in the Cincinnati General Hospital 1935–1947.** *J. Amer. Med. Ass.* 1949, July 9, v. 140, No. 10, 872–3, 1 chart.

" 1. There has been a striking decrease in the number of cases of pellagra seen in the Cincinnati General Hospital in recent years.

" 2. Since 1940 pellagra has occurred with increasing rarity, and in the last 30 months only 1 case has been seen.

" 3. This change occurred during a period when active studies of the disease were in progress and interest was sustained.

"4. The cause for this decrease in unknown. The most likely reason is the general improvement in the economic state of the population from which the hospital draws its patients.

"5. The program of enrichment of flour and various educational activities may have served to sustain the trend but did not initiate it."

COSTA, D. Pelagra associada a múltiplas desvitaminoses. [**Pellagra with Multiple Vitamin Deficiencies.**] *Hospital.* Rio de Janeiro. 1945, Feb., v. 27, No. 2, 323–39, 5 figs. English summary. [18 refs.]

The case is described of a boy of 7 years with signs of pellagra, butterfly patch, desquamation, fissures at the angle of the mouth, with decay of teeth, discoloured gums, dry conjunctiva and loss of lustre, mentally dull, resentful, irritable; his weight was only 22 kgm. and the general state of nutrition bad. The family was very poor; the child never had meat or milk; only once a week did he have fruit or vegetables, for breakfast and dinner coffee and bread; twice a week he had cornmeal.

Regulation of the diet and administration of nicotinic acid and, later, liver extract brought about cure. The author wishes to stress the fact that pellagra can exist without all the typical signs being present, and also that some symptoms not distinctly pellagrous according to the textbooks, may be basically so and thus clear up on anti-pellagra treatment. *H. Harold Scott*

SPRUE

FOX, H. J. **Observations on the Proteolytic Activity** *in vitro* **at Neutral Reaction of Gastric Juice from Patients with Sprue.** *J. Clin. Investigation.* 1949, July, v. 28, No. 4, 687–9.

"1. When equal quantities of normal human gastric juice and 1 per cent. casein solution are incubated at 37·5°C. and *p*H 7·4, there is a progressive increase in filtrable nitrogenous substances. The proteolysis was not considered to result from pepsin because the activity was maximal at *p*H 7·4. Also, since there was no significant increase in amino nitrogen within 24 hours, together with the persistent increase in total filtrable nitrogen after exposure to *p*H 10, it is considered that the proteolysis was not due to trypsin.

"2. The proteolytic activity of the gastric enzyme at neutral reaction, is present to a normal degree in cases of sprue in remission. It is greatly diminished in cases of sprue in relapse. The absence of proteolytic activity in cases of pernicious anemia suggests that the deficiency of intrinsic factor so characteristic of pernicious anemia, may be present in sprue in relapse.

"3. In two non-anemic normal subjects, it appears that infection inhibited this type of proteolysis to a considerable degree."

HAEMATOLOGY

SPIES, T. D., GARCIA LOPEZ, G., MILANES, F., STONE, R. E., LOPEZ TOCA, R., ARAMBURU, T. & KARTUS, S. **Observations on the Effect of an Animal Protein Factor Concentrate on Persons with the Macrocytic Anemia of Pernicious Anemia, of Nutritional Macrocytic Anemia and of Sprue, and on Persons with Nutritional Glossitis.** *Blood.* 1949, July, v. 4, No. 7, 819–26, 4 figs. [18 refs.]

"The intramuscular injection of animal protein factor concentrate to 5 cases of pernicious anemia in relapse, 4 cases of nutritional macrocytic anemia in

relapse, and 3 cases of tropical sprue in relapse was followed by a positive hematologic response in each case as is illustrated in figures 1, 2, and 4, respectively. The parenteral administration of this material to 3 patients with nutritional glossitis unassociated with anemia was followed by the disappearance of the redness and soreness of the tongue."

SETÄLÄ, A. **Studies on the Haemoglobin Values of the Blood and on Anaemia in the Population of the Kärkölä District.** *Ann. Med. Intern. Fenniae.* Helsinki. 1949, v. 38, Suppl. 4, 52 pp., 4 figs. [82 refs.]

Haemoglobin determinations were made on 4,075 persons of Kärkölä district of Finland ; this number constituted 70 per cent. of the population.

Four cases of frank *Diphyllobothrium latum* anaemia were excluded, but the series included 127 worm carriers. Analysed separately these showed the following figures :—

	Number	*Established mean grammes per 100 ml.*	*Divergence from expected value*
Men	36	13·21	+0·01
Boys	19	12·30	+0·14
Women	61	11·91	−0·12
Girls	11	11·80	−0·09
Total...	127	12·35	−0·05

The author notes that the effect of the presence of the worm appears to be greater on women than on men. *L. E. Napier*

TRINCÃO, C. Anemia de celulas falciformes. [**Sickle-Cell Anaemia.**] *An. Inst. Med. Trop.* Lisbon. 1948, Dec., v. 5, 357–400, 1 pl. [Bibliography.]

A useful compilation of the literature and present knowledge of sickle-cell anaemia, giving the names of the authors, the locality, the races of the patients and the numbers of observations, together with brief considerations and notes of the clinical symptoms, the physical signs and details of the blood changes. The whole is well documented ; more than 150 references are given and full credit to British observers. *H. Harold Scott*

NEEL, J. V. **The Inheritance of Sickle Cell Anemia.** *Science.* 1949, July 15, 64–6. [16 refs.]

SHEN, S. C., FLEMING, Eleanor M. & CASTLE, W. B. **Studies on the Destruction of Red Blood Cells. V. Irreversibly Sickled Erythrocytes : their Experimental Production in Vitro.** *Blood.* 1949, May, v. 4, No. 5, 498–504.

In sickle-cell disease when the erythrocytes are deprived of oxygen they tend to assume a sickle or oat shape, but when these cells are again exposed to oxygen the majority reassume their normal discoid shape. A certain number however do not recover their normal shape. These irreversible sickle cells differ from the others in showing no filamentous processes. The factors that cause this irreversibility were studied in a series of experiments with the blood of four patients with sickle-cell disease.

After the erythrocytes of these 4 patients had been incubated for 24 hours at 37°C. in the absence of oxygen, the older cells largely lost their ability to revert to the discoid form when again exposed to oxygen, but the reticulocytes largely retained this ability.

The studies confirmed the hypothesis that frequent stagnation of the red cells in the tissues with subsequent sickling eventually leads to the production of irreversible sickled forms.

The fact that sickled reticulocytes are seldom seen in blood films is accounted for by the observation that these young cells do not readily acquire the irreversible sickling property. *L. E. Napier*

PRATT-THOMAS, H. R. & SWITZER, P. K. **Sicklemia : its Pathological and Clinical Significance.** *Southern Med. J.* 1949, May, v. 42, No. 5, 376–83, 9 figs. [14 refs.]

In a series of 2,008 necropsies on negroes in South Carolina, some form of sickle-cell disease was demonstrated in 115 (5·72 per cent.) ; in 23 (1·14 per cent.) of these there was sickle-cell anaemia.

" While sicklemia need not be clinically significant and does not necessarily predicate a shortened life, it is believed that at times it is responsible for lesions and untoward results occurring in those states which produce a lowering of oxygen tension."

Any conditions causing shock, traumatic or otherwise, and prolonged general anaesthesia are liable to produce a general anoxaemia which results in an increase of sickling of erythrocytes accompanied by an increase in their viscosity. This causes localized agglutinations of erythrocytes which produce obstruction and infection without necessarily thrombosis ; the authors believe that thrombus formation is actually the exception rather than the rule. Thus localized agglutination causes local anoxia, damage to the vessel walls, transudation of fluid and haemo-concentration. A vicious circle is thus established which could only be reversed by oxygenation of the erythrocytes so that they recover their discoid shape.

The authors give a number of examples of patients who showed no evidence of sickle-cell anaemia but in whom death, usually after operations, was due to widespread vascular obstruction and others in which this was probably an important contributory cause of death.

In the discussion on this paper, Dr. Paul Kimmelstiel questions whether the " conglutination " of the red cells could be the primary cause since he cannot conceive that such a condition could be reversible. He believes that vascular spasm is the first event and that the conglutinations are secondary. In such circumstances relaxation of the vascular spasm could cause a reversal of the condition. *L. E. Napier*

FADEM, R. S. **Ovalocytosis associated with the Sickle Cell Trait.** *Blood.* 1949, May, v. 4, No. 5, 505–10, 3 figs. [13 refs.]

A case is reported in which a negro's blood showed both the sickle cell trait and ovalocytosis. In the peripheral blood the percentage of sickled cells varied from 3 to 11 and the percentage of ovalocytes from 65 to 84.

In the only previously reported case of this nature, some of the oval cells showed the sickling property, but in the present case in a sealed wet preparation only the normal, discoid cells sickled in 18 hours ; the ovalocytes underwent no change in 72 hours, and there was no increase in the numbers within this period. The blood picture was otherwise within the normal limits, except that there was an increased resistance to hypotonic saline solutions.

L. E. Napier

KAPLAN, E. & LEWIS, S. R. **The Effect of Human Plasma Transfusions on the Fecal Urobilinogen Excretion in Sickle Cell Anemia.** *Blood.* 1949, Aug., v. 4, No. 8, 947–57, 5 figs. [10 refs.]

" 1. The results of transfusions of whole plasma and blood on the fecal urobilinogen excretion of 5 children with sickle cell anemia have been reported.

" 2. The phenomenon observed by Josephs—a reduction in urobilinogen output following plasma transfusions—has been confirmed.

" 3. It has been observed further that in certain patients the continued use of plasma transfusions induces a reversal of this phenomenon, namely an increase in urobilinogen output after each transfusion.

" 4. The possible significance of these phenomena is discussed and attention is called to the limitations inherent in accepting urobilinogen excretion as a valid index of hemoglobin destruction in certain disorders in which a defect of hemoglobin metabolism may be present."

VENOMS AND ANTIVENENES

STANIĆ, M. **Acquired and Experimental Hypersensitiveness in Man and Animal from the Venom of the Vipera Ammodytes.** *Acta Med. Iugoslavica.* 1949, v. 3, No. 1, 1–8, 6 charts.

PHILPOT, V. B., Jr. **Influence of Snake Venom on Mammalian Erythrocytes in Vitro.** *Amer. J. Physiol.* 1949, July 1, v. 158, No. 1, 77–83. [10 refs.]

" Water mocassin and copperhead venoms bring about agglutination and subsequent hemolysis of washed human erythrocytes. The venom of the rattlesnake, *C. adamanteus*, also hemolyzes washed human erythrocytes, but not to the same degree as occurs with water mocassin and copperhead venoms. Human serum inhibits the hemolytic activity of the 3 venoms on human cells. Serum of the dog and sheep activates the action of water mocassin venom on their homologous erythrocytes, whereas serum of the rabbit and man acts as an inhibitor. Dog cells in the presence of serum are much more susceptible to the action of rattlesnake venom than are human cells. Fresh dog serum, heated dog serum and rabbit serum will activate rattlesnake venom hemolysis of dog cells."

BONSIB, R. S. **Black Widow Spider Bites: their Physiological Effects, Treatment and Prevention.** *Med. Bull.* New Jersey. 1949, May, v. 9, No. 1, 4–12, 1 fig.

MACKINNON, J. E. Breve revista sobre el arañismo cutaneo-gangrenoso y hemolitico en el Uruguay. [**A Note on Gangrene of the Skin and Haemolysis caused by the Bite of Spiders in Uruguay.**] *Arch. Uruguayos de Med. Cirug. y Especialidades.* 1948, Nov.–Dec., v. 33, Nos. 5/6, 173–7.

The English summary appended to the paper is as follows :—

" Brief review about gangrene of the skin, hemolysis and hemoglobinuria produced by the bite of spiders.

" One spider was captured and classified in the genus *Loxosceles*.

" General symptoms may be severe and death is not rare, but usually the general symptoms have a cyclic evolution during 5 days.

" An improvement is observed, usually, during the 5th day but it is more remarkable during the 6th day. Nevertheless, local symptoms last for several weeks."

DERMATOLOGY AND FUNGUS DISEASES

GREENWOOD, K. **Common Skin Disorders of the Army in the Tropics.** *J. Roy. Army Med. Corps.* 1949, June, v. 92 No. 6, 284–9.

This article consists of a survey of the commoner dermatological problems encountered at the Military Hospital, Singapore. Fungus infections were exceedingly common and accounted for 20 per cent. of all out-patients and 28 per cent. of inpatients. The most common fungus found was *Trichophyton mentagrophytes* which the author considered to be a variant of *Trichophyton interdigitale.* The author did not believe this to be indigenous to Malaya but considered that it was imported on the feet of the European soldier. Other species of fungus found were *Trichophyton interdigitale, Epidermophyton floccosum,* and *Trichophyton rubrum.*

On the face a typical ringed lesion might be found ; more commonly however tinea barbae presented with deep seated pustular lesions over the beard area, and the subsequent development of abscesses which sometimes reached considerable size. This is the condition known as Kerion.

On the feet an interdigital fungus might present as an area of redness, scaling and maceration or, as typical rings of vesicles or broken vesicles. The author emphasizes that the vesicle was a non-specific reaction to various aetiological agents. It might result from fungus infection in which case it could be cleared with fungicides or it might develop as a reaction to over-treatment. If more fungicides were applied to the latter condition it would be aggravated. Pompholyx was frequently encountered, appearing sometimes as a secondary reaction to an interdigital fungus infection, and sometimes as a non-specific eczematous eruption.

Prophylactic treatment of fungus infection was of the greatest importance ; every officer should be capable of looking at the skin for obvious lesions, and examining toe-clefts for early signs. A useful prophylactic paint was

Brilliant green	... ...	1·0
Hydrarg. perchlor.	...	0·1
70 per cent. spirit ad	...	100·0

For curative treatment, various fungicides were effective such as 2 per cent. chrysarobin in Lassar's paste, Whitfield's ointment and lotion, and Castellani's paint. The undecylenates and propionates did not appear strong enough to control infection.

Other conditions encountered were contact dermatitis and dermatitis medicamentosa. These were no less common in Malaya than elsewhere. Sensitivity to oil resulting in a vesicular eruption of the fingers, and dermatitis on the waist, thighs and buttocks as a result of sensitivity to green uniform were two conditions of frequent occurrence.

While mild cases of acne improved especially after exposure to sunlight, severe pustular acne did badly and men with this condition should not be sent out. Prickly heat responded to light airy clothing, sun bathing and sufficient baths to maintain cleanliness but no more. Soaps used should be of the blandest possible kind. In treatment, a 10 per cent. salicylic acid lotion could be used cautiously. The author concludes his article with the following useful hints : —Bullous impetigo was very common and could be treated with any mild antiseptic.

Scabies must be treated first, then the secondary infection ; chronic urticaria sometimes resulted from helminth infection. The diphtheria bacillus was an occasional cause of tropical ulcer. The depigmented patches on Malays were due to pityriasis versicolor and responded to any fungicide.

H. T. H. Wilson

SIMONS, R. D. G. **Is *Tinea albigena* Nieuwenhuis a Separate Disease or an Indonesian Pinta combined with Epidermophytosis ?** *Documenta Neerlandica et Indonesica de Morbis Tropicis.* Amsterdam. 1949, June, v. 1, No. 2, 182–91, 14 figs. [17 refs.]

Nieuwenhuis in 1903 described a form of mycosis involving mainly, and almost exclusively, the hands and feet : he found in association with the lesions a fungus which he grew and considered a *Trichophyton.* Though in respect of depigmentation it resembled *mal del pinto* in certain points, it was, he said, to be differentiated by the fact that *mal del pinto* never invades the palms or soles. Nieuwenhuis named the fungus *Trichophyton albisicans.* Later, in 1925, OTA transferred it to the genus *Clenospora*, and 10 years later still DODGE called it *Aleurisma albisicans.*

Nieuwenhuis described the disease as having two stages : papules and vesicles in the first stage and, years afterwards, depigmentation. At this time fungi were being recorded as being associated with and the cause of pinta. But— and this is very important — pinta has since been proved to be due to a spirochaete and the fungi mere chance concomitants, and also pinta may affect the hands and feet. The author gives brief notes of two cases, one of *melung* (pinta) and one of " Tinea albigena " (Nieuwenhuis's *Trichophyton albisicans*).

Very clear photographs illustrate this article and the discussion is full of interest and cannot be summed up better than in the author's own words in which he says he is led to conclude that :—

" (1) NIEUWENHUIS was mistaken in separating tinea albigena from pinta on the strength of the assertion that pinta does not invade the palms of the hands or the soles of the feet.

" (2) He demonstrated fungi that (*a*) are not specific, (*b*) are also found in epidermophytosis.

" (3) He described pleomorphism as a characteristic feature in a number of cases.

" (4) His picture of tinea albigena represented pinta or pintoid framboesia ; in some instances this disease may be clearly recognized.

" (5) His experiments with inoculation did not constitute proof. He was also unable to induce discolouration.

" (6) He found fungi that were isolated from vesicles on the soles of the feet, and around which no achromia had generally occurred.

" (7) ZIEMANN's melung was never conclusively separated from pinta ; its symptoms were identical with those of pinta, according to ZIEMANN's description.

" (8) The same holds good for JEANSELME's khi huen, which was also considered to be tinea albigena.

" (9) Nowhere in the literature can NIEUWENHUIS' findings be confirmed, but his false differential diagnosis has always been copied.

" (10) In my opinion the different names of the fungi being secondarily present have terminological significance only." *H. Harold Scott*

LEITE, A. S., DA LUZ, J. V. B. & DE MEIRA, M. T. V. Pé musgoso africano. [**" Mossy Foot " in Africa.**] *An. Inst. Med. Trop.* Lisbon. 1948, Dec. v. 5, 7–30, 11 figs. on 4 pls. [39 refs.] English summary.

In an expedition to Angola in 1945 the authors saw several cases of what is generally known as "mossy foot", first described by Wolferstan Thomas in 1910. They refer to the various accounts in the literature ascribing verrucous conditions of the feet and legs to *Acrotheca, Phialophora, Hormodendron,*

Fonsecaea and other fungi, and describe the lesions in the various stages in detail. These need not be stated here; the appearance is well known to readers of the *Bulletin*. The most interesting part of this contribution is that dealing with the diagnosis, for it shows that "mossy foot" is a generic rather than a specific term and covers—at all events has covered—a number of really different conditions. Among these are dermatitis verrucosa and forms of chromoblastomycosis, Madura foot, leishmaniasis, leprosy and elephantiasis and others less likely to be confused, such as syphilis, verruca peruviana and yaws.

The authors put forward the view that the cause may be a streptococcus which has gained entrance through some surface wound and that the inflammatory, hypertrophic and other changes are secondary to this, by setting up lymphatic obstruction and repeated "inflammatory crises."

Modes of treatment have been many: radiotherapy, thermocautery, elastic compression, chemotherapy with arsenicals, iodides, bismuth, acriflavin and potassium permanganate, but until more research has been carried out to determine the actual cause and to separate the various conditions included under the term mossy foot, the treatment must be largely empirical. The article is embellished with good photographs of the clinical condition and photomicrographs of the histological changes. *H. Harold Scott*

CAWLEY, E. P. **Sporotrichosis, a Protean Disease: with Report of a Disseminated Subcutaneous Gummatous Case of the Disease.** *Ann. Intern. Med.* 1949, June, v. 30, No. 6, 1287–94, 6 figs. [10 refs.]

A case of the rare disseminated subcutaneous form of sporotrichosis is described. The patient, a man aged 70, had suffered from a generalized papular, gummatous and ulcerative eruption on the skin for several weeks. The first lesion noticed was an erythematous papule, situated on the lower part of the back, which softened and ulcerated within a few days. This was followed quickly by the appearance of similar papules on the right thigh and right temporal region, and very soon by a generalized eruption affecting the face and neck, trunk and extremities. The lesions were indolent, discrete and polymorphic; varying from the size of a match-head to a cherry. They commenced as firm erythematous papules which later underwent central softening, broke down and discharged their purulent contents, leaving a central crateriform ulcer with firm indurated margins. Some of the lesions were in process of healing. In addition to the skin lesions, the proximal phalanx of the right great toe and of the left fourth finger as well as the middle phalanx of the right fourth finger were swollen and inflamed, and radiography showed an underlying osteomyelitis. Despite the large number of lesions the patient's general health appeared to be unaffected and the only subjective symptom was pruritus.

Sporotrichum schencki was isolated in culture from the lesions, although it was not found by microscopical examination of smears and sections. Prolonged and intensive treatment with potassium iodide brought about complete resolution of the lesions including those of the small bones of the hand and foot.

J. T. Duncan

KIRSCH, E. Die Histoplasmose. Eine Uebersicht. [**Histoplasmosis: a Review.**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1949, Aug., v. 1, No. 2, 287–300, 3 figs. [69 refs.]

A general account.

EMMONS, C. W. **Isolation of *Histoplasma capsulatum* from Soil.** *Pub. Health Rep.* Wash. 1949, July 15, v. 64, No. 28, 892–6, 12 figs. [15 refs.]

Although histoplasmosis was discovered by DARLING more than 40 years ago its epidemiology is still imperfectly known. The disease occurs in men and dogs and, recently, EMMONS *et al.* [this *Bulletin*, 1948, v. 45, 207] found it in the rat and mouse on a farmstead in Loudoun County, Virginia, where human and canine cases of histoplasmosis had occurred. Like other systemic mycoses caused by dimorphic fungi, histoplasmosis is not transmitted from host to host but infection is presumed to be caused by spores of the saprophytic form of the fungus vegetating in nature. Up to the publication of the present paper, no report of the discovery of the saprophytic form of the fungus vegetating under natural conditions had been made.

EMMONS, applying the methods which he used so successfully in his epidemiological study of coccidioidomycosis (*Pub. Health Rep.*, 1942, v. 57, 109) examined 387 samples of soil taken from the farmstead referred to above, and succeeded in isolating *Histoplasma capsulatum* from two. The fungus was isolated by inoculating the soil washings intraperitoneally into mice and making cultures from the liver and spleen of the animals which were killed from 3 to 5 weeks after the date of inoculation. Direct cultivation from the soil was impracticable because of the number of contaminating micro-organisms, but microscopical examination of the washings of the two infected soil samples showed the characteristic tuberculated macroconidia of the saprophytic form of *H. capsulatum.*

As the two significant samples had been taken from the same mass of red earth, apparently removed from rat burrows, it may be contended that they were merely contaminated by infected animals, but the discovery of the characteristic macroconidia showed that the fungus had vegetated saprophytically on the soil and indicated that the parasite can complete its developmental cycle in this environment. *J. T. Duncan*

TAYLOR, A. B. & BRINEY, A. K. **Observations on Primary Coccidioidomycosis.** *Ann. Intern. Med.* 1949, June, v. 30, No. 6, 1224–36, 5 figs. & 1 chart. [18 refs.]

Much of the ground covered by the authors has been dealt with in earlier papers by GOLDSTEIN & LOUIE [*Bulletin of Hygiene*, 1944, v. 19, 274], GOLDSTEIN & MCDONALD [*ibid*, 770], WILLETT & WEISS (1945) and SMITH *et al.* (1946) [this *Bulletin*. 1946, v. 43, 957 ; 1947, v. 44, 675].

Forty-three proved cases of primary coccidioidomycosis which included 39 males (7 were Negroes and 1 a Filipino) and 4 females, were studied clinically and followed-up after convalescence. The following symptoms were recorded : *Chest pain* (90 per cent. of the patients) was usually substernal and not sharply localized. It was aggravated by deep respiration and by coughing, but, no matter how severe it may have been, it invariably subsided after two days' rest in bed. *Cough* (44 per cent.) was usually nonproductive and tended to disappear after a few days' rest. Blood-streaked sputum was rarely seen. *Malaise* was a prominent symptom in 32 per cent. of the patients, but probably all patients suffer from it to some extent. It was the most persistent of all symptoms. *Fever and chills* (30 per cent.) ceased after a day or two in bed. The fever was usually of a low grade and the highest temperature recorded was 103°F. *Headache* of a generalized type was complained of by 28 per cent. of patients. *Dysphagia* associated with substernal pain occurred in 25 per cent. and, although relatively infrequent, it was one of the most characteristic symptoms. It was probably due to extensive hilar adenitis or low grade

mediastinitis. *Abdominal pain,* simulating gall bladder colic was present in two cases and was due to infiltration of the lung over the right dome of the diaphragm. *Erythema nodosum* occurred in 4 patients and *erythema multiforme* in 2 The coccidioidin test gave a positive result in all cases, and in 11 the reaction was intense. The highest initial red blood cell sedimentation rate was 51 mm. per hour and the average rate 32 mm. per hour. The prognostic value of serological tests was not investigated.

Radiological examination of the chest showed the following types of lesion : *Diffuse pneumonia-like infiltrations,* in 83 per cent. of the cases. These were usually isolated, peripheral and lobular, well circumscribed and of homogeneous density. They were usually accompanied by increased hilar shadows and sometimes by definite hilar adenopathy. Complete resolution of the peripheral infiltrations occurred in from 5 days to 3 months in some cases but in others they persisted up to 10 months and left a discrete fibrous nodule at the site of infiltration. Lesions in the lung apices simulated active reinfection tuberculosis. *Nodular parenchymal lesions,* said to be the most characteristic finding in the primary disease, were the discrete fibrous nodules representing the incomplete resolution of previous infiltrations, usually of the lobular type. They averaged 2 cm. in diameter, were single, isolated, well circumscribed and showed no evidence of calcification. They were equally distributed over upper and lower lobes. *Cavitation* occurred in lung nodules in two patients, in one case taking 11 days and in the other 8 months to become apparent. The cavities remained static for 5 to 10 months and were marked by their thin wall, the absence of a surrounding inflammatory reaction and their situation in the upper lobe. *Pleural effusion* occurred in 3 cases in association with parenchymal infiltrations. A minimal effusion was absorbed in 3 days and a massive one in 3 weeks.

Treatment consisted of rest in bed and treatment of symptoms.

Chemotherapy was not employed. An outstanding feature of this disease was the almost universal feeling of well-being which made the patient reluctant to accept the necessary rest treatment. *J. T. Duncan*

RITTER, F. H. Tumor cerebral granulomatoso por paracoccidióide a propósito de dois casos operados. [**Two Cases of Granulomatous Brain Tumour operated upon and shown to be due to** *Paracoccidioides brasiliensis.*] *Arquivos de Neuro-Psiquiatria.* S. Paulo. 1948, Dec., v. 6, No. 4, 352–9.

The English summary appended to the paper is as follows :—

"The author presents two cases operated on of granulomatous cerebral tumor—one of the cerebral hemisphere, and the other from the cerebellum—caused by *Paracoccidioides brasiliensis.* In both cases the preoperative diagnosis had been of brain tumor, probably glioma. Nothing in the anamnesis nor in the neurological examination gave any hints of the real cause of the disease. Even though probably rare, the solitary cerebral micomas deserve consideration when making a neurosurgical differential diagnosis in our country."

TROPICAL OPHTHALMOLOGY

TURTZ, C. A. **Solar Burns of Fundi.** *New York State J. of Med.* 1948, Nov. 15, v. 48, 2489. [Summary taken from *J. Amer. Med. Ass.* 1949, Apr. 2, v. 139, No. 14, 962.]

Turtz observed 5 cases of burns of the retina during the past four years. Three were seen within a few days after exposure to strong sunlight. The

other 2 were seen four to six hours after exposure to sun lamps. All 5 complained of pain, photophobia and lacrimation, and all had conjunctival injection to a varying degree several hours after exposure. An early examination with the ophthalmoscope may reveal nothing pathologic, or a pale spot, surrounded by a brownish ring, may be seen at the fovea. Later, there may be pigment deposits and a small gray punctate spot around the fovea, and this may be replaced by a hole. The prognosis should be guarded. Even though improvement may occur, a positive scotoma with permanent impairment in vision usually results. The public should be enlightened as to the dangers of prolonged exposure to sunlight and the careless use of sunlamp treatments without adequate protection to the eyes.

RISQUEZ-IRIBARREN, R., CORDERO MORENO, R. & ANDUZE, P. J. Consideraciones generales acerca de la conjuntivitis epidemica. [**Reflections on Epidemic Conjunctivitis.**] *Bol. Med.* Caracas. 1949, Jan., v. 1, No. 2, 109–26, 1 map. [24 refs.] English summary.

In parts of Western Venezuela, notably Dabajuro, Maracaibo, and, further east, San Felipe, Chivacoa and Acarigua, outbreaks of conjunctivitis occurred, usually of a mild character and clearing up spontaneously. Occasionally there would be phlyctenules and corneal ulcers, or some superficial punctate keratitis. The outbreaks would coincide with the early rains and a temporary abundance of mosquitoes. Cases, both in 1947 and 1948, were 2½ to 3 times as numerous in the second half of the year, that is the rainy period.

The authors discuss whether this is the same as the epidemic kerato-conjunctivitis as has been reported from the United States and due to a virus, but apparently no investigations have been undertaken to confirm or refute this hypothesis. Common insects and possible vectors are *Hippelates flaviceps*, *H. impressus* and *Siphunculina signata*. These frequent excreta and refuse dumps and in the places where the outbreaks occurred sanitation is said to be primitive. The Koch-Weeks organism has been found in 40 out of 50 cases examined. [Not a very satisfactory paper. It consists of general remarks on a condition whose aetiology can be decided only by intensive laboratory studies which could not be—at all events were not—undertaken in these cases.] *H. Harold Scott*

SARNELLI, T. Melanodermia umana e tracoma. [**Melanodermia and Trachoma in Man.**] *Riv. di Biol. Colon.* Rome. 1947, v. 8, 117–31. [Refs. in footnotes.]

The author refers in general terms—no figures are given—to various places and people over the globe and puts forward the thesis that the degree of colour in the skin is protective against trachoma, the darker the skin of a people the less prevalent is trachoma among them.

If there is anything in this theory, more detailed investigation and statistical studies will doubtless be undertaken to support or refute it.

H. Harold Scott

MOUTINHO, H., GRILO, M. & DE MOURA, S. Primeiros ensaios de tratamento do tracoma com aureomicina. [**First Trials of Aureomycin in the Treatment of Trachoma.**] *Gaz. Méd. Portuguesa.* 1949, v. 2, No. 2, 497–500. English summary.

The authors first tried an aqueous solution of aureomycin and later one with borate and chloride of sodium, but these proved very unstable, losing their activity in 48 hours even though kept in an ice-chest. They therefore resolved

to make a fatty preparation whose effect could be aided by a massaging action through the eyelids. Aureomycin as a powder is quite stable and they obtained an anhydrous neutral excipient (*p*H 7·7) made up of equal parts of aureomycin hydrochloride and pure sodium borate, 25 mgm. in each 5 gm. of the ointment. This was applied every 3–4 hours for 2–10 days. Administration *per os* of aureomycin combined with the ointment locally "seems very favourable" and was well tolerated in a dose of 25 cgm. every 3 hours, or 50 cgm. every 6 hours. A table gives details of 15 patients in stages I to IV of the disease; their sex, age, condition before treatment was begun, the duration of the treatment and the results, with a column for remarks. With one exception the longest time of treatment was 8 days and some showed amelioration in 48 hours or even less. In brief, the results were most encouraging.

H. Harold Scott

TROPICAL ULCER

GORDZIALKOWSKI, H. **Contribution to the Therapy of Tropical Ulcer.** *Bull. Inst. Marine & Trop. Med., Med. Acad. Gdańsk, Poland.* 1948, v. 1, No. 1, 17–22.

This paper is a summary, from memory, of work carried out for three years before the war in the Belgian Congo: the author's records were subsequently lost as a result of enemy action. He now points out that since he devised his method, great chemotherapeutic studies have been made: but he feels that it is worthy of record owing to its simplicity and cheapness.

He considers that pure crystalline boric acid has a strong germicidal action, without destroying the tissues. After curettage of necrotic masses, the ulcer is liberally covered with the crystalline boric acid daily for three days or longer if required. Usually (except in very refractory cases requiring repeated curettage or cauterization) the ulcer was almost dry and beginning granulation on the fourth day. At this stage, spirochaetes and fusiform bacteria were absent.

Thereafter an ointment was applied, at first daily, and subsequently every other day or third day. This consisted of:—

Zinc oxide	100 gm.
Dermatol [Bismuth oxygallate]	100 gm.
Balsam of Peru	50 gm.
Vaseline	100 gm.
Lanoline	50 gm.
Liquid vaseline to make a paste	

This is applied in a fairly thick layer and it is claimed that it produces a rapid epidermization. Complete healing of an ulcer of 5 cm. diameter occurred in 3 to 4 weeks and smaller ones healed in 2 or 3 weeks.

A description is given of a severe chronic case which eventually responded to this treatment after several months during which other forms of treatment had failed.

After several months of this treatment, the number of patients in ulcer wards in the author's hospital was halved and their average stay in hospital shortened to about one-third. The application of boric acid was usually completely painless, but occasionally was very slightly painful. Crystalline boric acid was found to exert "an uncomparably better action than powdered boric acid."

Later, in Poland during the war, the author used boric acid in non-specific ulcers. It was quite ineffective and occasionally even harmful, but the ointment was often useful. It is therefore suggested that the boric acid has some specific effect on tropical ulcer, possibly because the slightly increased acidity is unfavourable to the life and growth " of specific microbes, in this case presumably spirochaetes and fusiform bacteria."

H. J. O'D. Burke-Gaffney

MISCELLANEOUS DISEASES

CARRILLO, E. G. **Some Cardiological Problems of the Tropics.** *Amer. J. Med. Sci.* 1949, June, v. 217, No. 6, 619–26. [39 refs.]

The author has analysed 8,000 autopsies at San Juan de Dios Hospital in Costa Rica and finds that cardiovascular disease accounted for 768 deaths (9·6 per cent.). The quinquennial mortality rate from this cause has risen—as it has in every country in which statistics are kept—between 1916 and 1940 by nearly 50 per cent., from 84·7 to 122·3 per 100,000 inhabitants.

After remarks on the physical geography of Costa Rica, the author considers the question of heart disease under three heads: 1. The frequent causes; 2. The rarer causes; 3. The heart in relation to some tropical diseases. In the first, sclerosis heads the list with 4·4 per cent. of all autopsies and 46·1 per cent. of cardiac deaths, rheumatism coming next with 20 per cent. of cardiac deaths; syphilis follows closely with 19·1, but, if negroes are excluded from the last, the percentage is only 13. Coronary disease is relatively rare and this is attributed by the author to the diet being deficient in fats. Among the rarer causes are mentioned pericarditis, myocardial abscess and cysticercosis of the myocardium. Acute bacterial endocarditis was seen on two occasions only, but there were 19 of the subacute variety [nothing is said of the causative organism]. In his remarks on the heart in relation to some tropical diseases the author says that, although Chagas's disease is seen in Costa Rica he has not come across a case among the 8,000 autopsies. Ankylostomiasis is very common and the anaemia resulting therefrom may account for some of the deaths from pulmonary embolism. Ten deaths were due to bites by *Bothrops atrox* and *B. schlegelii* and in these patients there were sub-endocardial and epicardial petechial haemorrhages. In such patients during life the electrocardiograms showed a low amplitude T wave and " slight depression of the ST junction in precordial lead CR5 with prolonged QT " but only in those showing toxic symptoms. These changes have been found in potassaemia and it is thought that they may be due to this cause in these patients. *H. Harold Scott*

JELLIFFE, D. B. **Splenic Abscess in the Tropics.** *J. Trop. Med. & Hyg.* 1949, July, v. 52, No. 7, 134–40, 3 figs. [32 refs.]

Splenic abscess may be *primary* with no discoverable cause, or *secondary* in which the aetiology is known. The latter group may be (*a*) embolic (*b*) traumatic, or (*c*) due to direct infection from a suppurating viscus. (*a*) *Embolic* :—The infection is carried to the spleen *via* the portal system as an ascending pylephlebitis with thrombosis of the splenic vein, as a result of intra-abdominal suppuration, a complication not usually recognized until revealed by autopsy; alternatively the spleen may be infected through the systemic arteries from a primary focus elsewhere, sometimes appearing months after the original lesion has settled down. In the tropics the typhoid group of

fevers is an important factor in the aetiology and the latent period before the appearance of the abscess may be very long ; 19 years has been recorded. Amoebic abscess of the spleen may be solitary or associated with hepatic abscess ; infection may be *via* the portal system or direct from an adherent infected splenic flexure ; it manifests itself by a high swinging temperature, tender, enlarged spleen and leucocytosis. Aspiration produces sterile anchovy-sauce pus in which amoebae are not usually found ; improvement is rapid with emetine. Abscess of the spleen may occur in relapsing fever from infarction of splenic arterioles, in Egypt, EL-RAMLY [this *Bulletin*, 1948, v. 45, 185] found splenic infarcts in 20 per cent. of 139 fatal cases of relapsing fever and abscess of the spleen in 11·5 per cent. Recently L. A. NASR [*ibid.*, 604] recorded seven cases occurring two or three weeks after relapsing fever, successfully treated by drainage. (*b*) *Traumatic* cases usually follow non-penetrating injuries with subsequent infection of a haematoma. (*c*) *Direct infection* may occur from spread of a suppurative process in an adjacent viscus, *e.g.*, leaking gastric ulcer, perinephric abscess, etc. the onset may be sudden or insidious and may be overshadowed by the symptoms of the causative infection. Pain in the left hypochondrium, worse on coughing and radiating to the left side of the chest is the most constant symptom ; fever is usually high, but in chronic infections it may be slight. The spleen is enlarged and tender, and in late cases may be adherent, the abscess pointing through the abdominal wall. Physical signs in the chest, pleural effusion and raising of the diaphragm with displacement of the heart on radiography are common. Treatment is by aspiration, followed by penicillin, with drainage by the abdominal route if this fails.

Primary abscesses have been reported more frequently from the tropics than elsewhere. WALLACE in N. Rhodesia has recorded 49 seen in two years ; 19 of these were diagnosed and drained, with an 80 per cent. recovery rate. Onset was sudden with fever and rapid enlargement of the spleen, which at operation was found to be adherent to the abdominal wall. The abscess cavity contained gas and up to eight pints of pus, usually sterile, and no amoebae were found. Laboratory examinations were negative for typhoid, undulant fever and syphilis. Thrombophlebitis of the leg veins developed later in a high percentage of cases, sometimes associated with intestinal thrombosis. Cases have been reported from other parts of the tropics. Two cases which were successfully treated are described. The author considers that the most probable aetiology is slight injury to a spleen already enlarged and vascular from malaria or other cause, producing subcapsular haemorrhage, which later becomes infected. Thrombosis of the splenic vein producing colliquative necrosis is probably an important factor in some cases. *W. L. Harnett*

CRUICKSHANK, J. C. **Failure of Aureomycin in Experimental Melioidosis.** *Brit. Med. J.* 1949, Aug. 20, 410–11.

Generalized melioidosis is almost invariably fatal, and recovery usually occurs only in those cases with localized superficial abscesses. Although no satisfactory therapeutic agent has yet been described, varying degrees of success and failure have been reported with certain sulphonamides and antibiotics : chloromycetin (chloraphenicol) has been shown to be highly inhibitory to *Pf. whitmori in vitro*. The author discusses these various reports, as summarized by GREEN and MANKIKAR [this *Bulletin*, 1949, v. 46, 498] and then describes a small laboratory trial of aureomycin in the experimental treatment of the disease.

Tests of the inhibitory action of aureomycin *in vitro* were made after the method of PAINE *et al.* [see *Bulletin of Hygiene*, 1949, v. 24, 274], and the

technique is described. The final concentration of aureomycin ranged from 100 to 0·4 μgm. per ml. Strains of *Str. pyogenes* and faecal *Bact. coli* were tested in parallel. A table shows the results, which indicate that *Pf. whitmori* was inhibited by 12·5 μgm. per ml. of aureomycin in broth and by 6·3 μgm. per ml. on a plate: its sensitivity was more closely related to that of *Bact. coli* than to that of the haemolytic streptococcus. It is pointed out that levels up to 2 μgm. per ml. may be obtained in the blood four hours after a single oral dose of 500 mgm. in healthy persons: this falls in 12 hours to about 0·49 μgm. per ml. [see SCHNEIERSON & TOHARSKY, *Bulletin of Hygiene*, 1949, v. 24, 895].

A small and rapid preliminary *in vivo* test was then made in guineapigs: and Professor Cruickshank points out that its limited nature had the advantage of reducing the number of persons exposed to laboratory animals with this reputedly highly dangerous organism. Great care was taken to minimize the hazards.

Nine different infecting doses of *Pf. whitmori*, from 500 million to 5 organisms, were injected into groups of guineapigs, half of which were treated intraperitoneally with aureomycin morning and evening, from the time of infection to the end of observation. The dosage varied from 1 to 4 mgm.

The results are shown in a table: the strain was very virulent and death occurred in 4 to 11 days according to the infecting dosage. There was little difference between the treated and control animals, in respect of the typical lesions produced, or in the fatal course of the disease: the slightly longer survival-time of some of the treated animals was not significant.

The *in vitro* tests did not suggest that larger doses of aureomycin would be likely to be beneficial: and the dosage and spacing actually used conformed with those found effective in other infections, *e.g.* Weil's disease.

It is evident that aureomycin did not materially influence the course of experimental melioidosis in guineapigs. *H. J. O'D. Burke-Gaffney*

GELFAND, M. **Some Peculiar Cases of Gangrene and their possible relationship to Tropical Phlebitis.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1949, July, v. 43, No. 1, 75–8, 3 coloured pls.

Gelfand has already shown [this *Bulletin*, 1949, v. 46, 575] that in tropical phlebitis there may be a simultaneous spasm of the artery or arterioles corresponding to the affected vein, which is an essential part of the cause of the oedema which accompanies the phlebitis. He found that this oedema disappeared if the influence of the sympathetic nervous system on the arterioles was eliminated by local injections of planocaine. He now reports two cases of gangrene of the fingers, following pain and swelling, in which the lesion was probably a primary phlebitis with associated arteriolar spasm. In each case the radial artery could not be palpated though the brachial artery was pulsating normally. The patients were Africans aged 48 and 15 years respectively, and were otherwise healthy.

As an illustration of the fact that thrombophlebitis complicating acute infections may also lead to gangrene, the author quotes the case of an African child with pneumonia and gangrene of one foot. The gangrene in this case could best be explained as due to thrombophlebitis with arterial spasm, for the arteries of the affected foot could not be felt, though the popliteal artery was pulsating. The first two cases were probably of primary phlebitis; the last was most probably secondary. *Charles Wilcocks*

ANGRISANI, V. Cinque casi di Ainhum riscontrati sul Gebel Nefusa. Considerazioni sulla etiopatogenesi dell' "Ainhum" vero e proprio. [**The Aetiology of Ainhum. Five Cases seen in Gebel Nefusa (Tripolitania).**] *Boll. Sanitario d. Tripolitania.* 1949, Apr.–June, v. 7, No. 2, 17–22, 2 figs. English summary.

The author has seen five cases of ainhum in one district of Tripolitania in a single year ; three in adult male arabs and two in immigrants from Fezzan, one of them an elderly woman (? 67 years). The last is reported in detail, but it was quite typical and need not be repeated here. The author then tells how writers of a long time ago used to speak of syphilis or leprosy or yaws or syringomyelia as causes of the condition and, later, of ainhum as occurring in, though not aetiologically connected with, syphilis, leprosy, etc. He considers each of these in turn and concludes that any slight trauma may initiate the lesion and subsequent inflammation of low-grade result in the formation of a constricting fibrous band or ring which cuts off the nervous and vascular supply until the tissues are destroyed and that ainhum is just a fortuitous surgical condition in countries where the inhabitants go about barefoot. *H. Harold Scott*

FLOCH, H. & DE LAJUDIE, P. Pseudo-myiase rampante en Guyane Française. [**Creeping Eruption in French Guiana.**] *Institut Pasteur de la Guyane et du Territoire de l'Inini. Publication No. 134.* 1946, Sept., 4 pp. [22 refs.]

The authors have already reported three cases of creeping eruption in French Guiana and they now report three more, seen in 1945.

The first, in a boy of 14, was on the inner surface of the left knee ; the second, in an adult, on the right palm and wrist ; and the third, in a European adult, over the left internal malleolus. No causative parasite could be found by dissection.

The authors discuss the literature and principal features of creeping eruption at some length. *H. J. O'D. Burke-Gaffney*

HORTON, S. H., Jr. **Creeping Eruption. Report of a Case with Loeffler's Syndrome.** *U.S. Nav. Med. Bull.* 1949, July–Aug., v. 49, No. 4, 703–6, 5 figs.

" 1. A case of creeping eruption with associated Loeffler's syndrome is reported.

" 2. The larvae were effectively eradicated with fuadin and ethyl chloride spray.

" 3. In all cases of creeping eruption serial roentgenograms of the chest should be taken as this is the only means of confirming the transient pulmonary infiltrations."

ENTOMOLOGY AND INSECTICIDES : GENERAL

DONOSO BARROS, R. Un caso de myiasis digestiva en Chile. Consideraciones sobre una nueva etiología, Lucilia Caesar (Linnaeus) 1758. (Nov. Sp. in Fauna Chilensis.) [**A Case of Intestinal Myiasis in Chile. Notes on** *Lucilia caesar*, **a Species New to Chile.**] *Rev. Med. Chile.* 1949, Mar., v. 77, No. 3, 209–11. [12 refs.]

The following is a translation of the author's summary :—

The author reports for the first time a case of symptomless intestinal myiasis caused by larvae of *Lucilia caesar* (Linnaeus) 1758, a species newly recorded

among Chilean fauna. With this species, the number of flies whose larvae are parasitic to man in Chile amounts to 14. *H. J. O'D. Burke-Gaffney*

LEWIS, D. J. **Tracheal Gills in some African Culicine Mosquito Larvae.** *Proc. Roy. Entom. Soc. of London.* Ser. A. 1949, June 15, v. 24, Pts. 4/6, 60–66, 2 figs. [10 refs.]

VAN DER KUYP, E. **Notes on** *Haemagogus anastasionis* **Dyar of Curaçao.** *Documenta Neerlandica et Indonesica de Morbis Tropicis.* Amsterdam. 1949, June, v. 1, No. 2, 142–4, 1 fig.

"From 1941 to 1947, *Haemagogus anastasionis* DYAR, 1921, was found in 12 places spread over the island of Curaçao. It is not abundant and is found only after occasional heavy rains. It attacks man readily. Breeding places are usually water-containing tree holes. Once it was collected from a truncated cactus and once from a rock hole."

TWINN, C. R. **Mosquitoes and Mosquito Control in Canada.** *Mosquito News.* 1949, June, v. 9, No. 2, 35–41.

TRAVIS, B. V., GJULLIN, C. M., BLANTON, F. S., SMITH, N. & WILSON, C. S. **Prehatching Treatments for the Control of** *Aëdes* **in Alaska.** *Mosquito News.* 1949, June, v. 9, No. 2, 42–8. [10 refs.]

MCDUFFIE, W. C., SHARP, J. F., CROSS, H. F., TWINN, C. R. & WILSON, W. M. **The Effectiveness of Prehatching Treatments for the Control of Arctic Mosquitoes.** *Mosquito News.* 1949, June, v. 9, No. 2, 51–6.

SACCÀ, G. *Phlebotomus mascittii* Grassi 1908 e i suoi sinonimi. [*Phlebotomus mascittii* **and its Synonym.**] *Riv. di Parassit.* Rome. 1948, Dec., v. 9, No. 4, 223–6, 2 figs. [13 refs.]

The English summary appended to the paper is as follows :—

"The author makes some considerations, by which *P. larroussei* Langeron and Nitzulescu 1931 is to be considered as a synonym of *P. mascittii* Grassi 1908."

LEWIS, D. J. & KIRK, R. **The Zoogeography of the Ethiopian Species of** *Phlebotomus* **Agassiz (Diptera, Psychodidae).** *Proc. Roy. Entom. Soc. of London.* Ser. A. 1949, June 15, v. 24, Pts. 4/6, 51–5.

The distribution records of seventy-five species and varieties of sandflies of the genus *Phlebotomus* from the Ethiopian region have been examined and are tabulated in this paper according to the seventeen faunal districts in Africa recognized by Chapin. The table is accompanied by a few brief notes on distribution and on ecological classification. *H. S. Leeson*

GRENIER, P. & DOUCET, J. Simulies de Madagascar. *S. buckleyi* de M. ; *S. neireti* Rbd., ♀, nymphe, larvae ; *S. milloti* n. sp., ♀, nymphe, larvae ; *S. ruficorne* Macq. [**Simuliidae of Madagascar.** *S. buckleyi,* **de M.** ; *S. neireti* **Rbd., ♀, Nymph, Larva ;** *S. milloti* **n. sp., ♀, Nymph, Larva ;** *S. ruficorne* **Macq.**] *Bull. Soc. Path. Exot.* 1949, v. 42, Nos. 3/4, 127–9.

GEIGY, R. L'hypertrophie parasitaire de la femelle de *Tunga penetrans*. [**The Hypertrophy of the Female** *Tunga penetrans*.] *Bull. Soc. Path. Exot.* 1949, v. 42, Nos. 3/4, 123–5.

The author has studied the swelling of the female chigger flea, *Tunga penetrans*, and describes the process step by step. The great expansion of the membrane between the second and third abdominal segments and the lesser expansion of the membrane between the first and second is not a simple dilatation but a multiplication of the cells to accommodate the enlarging intestines and Malpighian tubules. At the same time the powerful muscular system is being adjusted and built up to support these enlarged organs and to counter the pressure provoked by them. Contrary to what was expected, the developing of the ovarioles and the ripening of the eggs does not occur simultaneously with these developments, but forms the second half of the process of enlargement ; moreover, the eggs do not develop one at a time as in other fleas but in batches of seven to ten, all the eggs in one lot maturing together. *H. S. Leeson*

BUTTNER, A. Refixation accidentelle d'un mâle de *Hyalomma excavatum* sur l'homme. [**Accidental Attachment of a Male** *Hyalomma excavatum* **to Man.**] *Ann. Parasit. Humaine et Comparée.* 1949, v. 24, Nos. 1/2, 186–7.

Though ticks of the genus *Hyalomma* are mainly of veterinary interest they have from time to time been recorded on man, but they have commonly been identified as *H. aegyptium*. Laboratory workers have recorded this tick and related species as being capable of causing pathological effects in man, but the author points out that identification of species within this genus presents certain difficulties because of resemblances and variations among them ; nevertheless, he wishes to place on record that, in 1948, while engaged in rearing *H. excavatum* on sheep at Richelieu, Indre-et-Loire, France, he found a male tick on himself and that he tried unsuccessfully to induce other ticks to attach themselves. *H. S. Leeson*

THÉODORIDÈS, J. Les coléoptères parasites accidentels de l'homme. (Note complémentaire). [**Coleoptera as Accidental Parasites of Man.**] *Ann. Parasit. Humaine et Comparée.* 1949, v. 24, Nos. 1/2, 110–15. [12 refs.]

In continuation of his previous paper [this *Bulletin*, 1949, v. 46, 785], the author lists eighteen species of beetles or their larvae reported as having been found in the human body or passed out from the intestines. In particular he quotes more records concerning *Tenebrio molitor* and *Blaps mortisaga* and discusses the evidence in one case where a woman was reported to have passed *per anum* three larvae of *Ptinus tectus*. *H. S. Leeson*

MINISTRY OF AGRICULTURE AND FISHERIES. **Specifications and Methods of Analysis for certain Insecticides and Fungicides.** Technical Bull. No. 1, 64 pp. 1949. London : H.M. Stationery Office. [1*s*. 3*d*.]

KEATINGE, A. F. H. **A Hundred Years of Insecticides and Repellents in the Army. (A Historical Summary.)** *J. Roy. Army Med. Corps.* 1949, June, v. 92, No. 6, 290–312. [39 refs.]

BHATTACHARYYA, J. **Studies in Compounds of the DDT Type. Part I.** *Ann. Biochem. & Exper. Med.* Calcutta. 1949, Jan.–Feb., v. 9, No. 1, 5–6.

BHATTACHARYYA, J., DUTT, A. K., BHOWMIK, H. & RAY, S. N. **Studies in Compounds of the DDT Type. Part II.** *Ann. Biochem. & Exper. Med.* Calcutta. 1949, Jan.–Feb., v. 9, No. 1, 7–8.

LABORATORY PROCEDURES

EL KORDY, M. I. **A Simple New Stain for Intestinal Protozoa.** *J. Roy. Egyptian Med. Ass.* 1949, May, v. 32, No. 5, 426–8.

Quercitrin is a three-rhamnose glycoside and is one of the most widely distributed natural pigments. It occurs in many plants, such as horse-chestnut, vine leaves, hops and tea and in the brownish outer skin of the Egyptian onion, *Allium cepa.*

An infusion of this skin, prepared by boiling it until a deep brownish colour is obtained, may be used for staining of intestinal protozoa. It may be used immediately, without ripening, mordant or differentiating solutions. On storage of the infusion, some sediment occurs, but this does not interfere with staining.

Coverslip preparations of infected stool are fixed in Schaudinn's fluid for about 25 minutes and transferred to 70 per cent. alcohol and a little iodine (Weigert-Lugol's iodine) for 30–60 minutes. After two changes in pure 70 per cent. alcohol, the slip is transferred to the dye solution which is diluted with 70 per cent. alcohol (staining solution, four parts ; alcohol, one part) for about two hours at 37°C. or preferably overnight. Undiluted stain may be used and staining also occurs at room temperature. The coverslip is then washed in several changes of running tap water, left in it for about four minutes, dehydrated, cleared and mounted.

It is stated that the stain shows great selectivity and contrast between the cell elements and it is claimed that in selectivity and contrast as a nuclear stain, it gives results equal if not superior to the well known haematoxylin solutions. *H. J. O'D. Burke-Gaffney*

REPORTS, SURVEYS AND MISCELLANEOUS PAPERS

COLONIAL OFFICE. **A Note on some of the Scientific Studies undertaken by Members of the Colonial Medical Service during the Period 1930–47, with a Bibliography.** Miscellaneous No. 515. 47 pp. 1949. The Church House, Westminster, S.W.1. [Summary appears also in *Bulletin of Hygiene.*]

The anonymous author of this note introduces his brief surveys of the various branches of medical enquiry which engaged the attention of the Colonial doctors, by observing that the volume of published papers written by those doctors is " far from negligible ". This is borne out by the 28 pages of references given to the titles of those papers and the journals in which they were published ; 157 of them were published in the *Transactions of the Royal Society of Tropical Medicine and Hygiene,* and no less than 494 in the *East African Medical Journal.* At the same time, however, he makes the important point that most of the records of routine clinical, laboratory and preventive duties are to be found in departmental papers dealing with specific local problems ; for instance, " some of the most valuable information on trypanosomiasis is to be found in the Annual Medical Reports of the African territories." [The pioneer work of Dr. G. Maclean, when he was Sleeping Sickness Officer in Tanganyika Territory, is a case in point.]

The author also makes the point that laboratory facilities are limited in the tropics [though there are excellent research laboratories at Lagos, Entebbe, Nairobi, Kuala Lumpur and a few other places, in addition to the laboratories for routine work in the various countries]. This being so, much of the work

which required refined techniques has been done outside the Colonies themselves, in laboratories in Britain and elsewhere, and by scientists not members of the Colonial Medical Service ; when facilities improve, however, it may be expected that the opportunities for work on the spot will attract research workers to the Service. But laboratory work is not enough, and " the last word must come from the records of happenings in the field " ; it is in this sphere that so much of the valuable work here recorded has been done. Much of it has been tedious, carried out under difficult physical and mental conditions, in countries where vital statistics as we know them do not exist, and where continued observation of communities is almost impossible in the detail needed for statistical analysis.

The author gives short summaries of the important work done in the period 1930–47, on the following groups of subjects :—Nutrition and Deficiency Diseases ; Malaria ; Trypanosomiasis and Tsetse Flies ; Plague ; Tuberculosis ; Leprosy ; Yellow Fever ; Rabies ; Typhus ; Helminthology ; Haematology ; Blackwater Fever ; Neurology and Psychiatry ; Pathology ; Miscellaneous Studies. These short accounts should be read to be appreciated—they can hardly be condensed.

It would be a mistake to think that the investigations carried out in the Colonies have exclusively concerned the diseases conventionally regarded as tropical. This is by no means the case, and the sections on Nutrition ; Tuberculosis ; Neurology and Psychiatry ; Pathology ; and Miscellaneous Studies cover a very wide field. It is well known to those who have served in the tropics that half the troubles are non-tropical ; but the tropical diseases have always rewarded research and have usually attracted it rather more than the rest.

A technical point on the bibliography is perhaps worth mention. When two or more authors have published a paper, the full reference will be found under the name of the first author, but not under the names of the others (the bibliography is in alphabetical order of first authors' names). For instance, two papers by OWEN and HENNESSEY are cited under O, but in the list of papers by HENNESSEY (under H) there is no indication that he had collaborated with OWEN ; similarly the monograph by POYNTON and HODGKIN is cited under POYNTON but not under HODGKIN ; NIVEN's work largely (but not entirely) appears under FIELD and NIVEN. This has the advantage that it does not swell the list by duplication of references, but it has the disadvantage that it is not possible to be sure that all papers published by one person appear in one place. There are certain other features of citation which could be improved.

This modest publication is an account of an impressive amount of good work done in a period which includes the recent war ; it is doubtful if any other medical service of comparable size could show a better record.

Charles Wilcocks

BARRETT, R. H. **Health Regulations for Air Travel (III).** *Brit. Med. J.* 1949, Aug. 6, 329. [Summary appears also in *Bulletin of Hygiene.*]

In October 1948 an Expert Committee on International Epidemiology and Quarantine met in Geneva, and considered a revision of the International Maritime and Aerial Sanitary Conventions, which are to be replaced by WHO Sanitary Regulations. The Committee adopted a liberal attitude, in the direction of relaxation of some of the existing restrictions. Certain principles were proposed, on which the WHO Regulations for air travel will be based, as follows :—

" 1. *Plague and Typhus Inoculations.*—These inoculations will not be required of travellers by the new regulations. It was considered by the committee that the use of new insecticides and rodenticides now available should be the most effective method of dealing with outbreaks of these diseases.

"2. *Cholera Inoculation.*—This inoculation will not ordinarily be required of travellers; but it will be permissible for individual Governments to require it of passengers coming from local areas infected with cholera.

"3. *Transit Passengers.*—Air passengers in transit through foreign airports will not be subjected to any sanitary measures in force for that locality—*e.g.*, compulsory inoculations or vaccinations—provided that they are not suffering from an infectious disease and that they do not leave the precincts of the airport. A passenger will not be considered to have left the airport if he is conveyed to another airport in the same vicinity under the supervision of the health authority.

"4. *Immunization of Travellers.*—The committee's views on the subject of immunization of travellers as a quarantine measure are worth quoting at length:

> 'The committee noted that there had developed since the last war a widespread tendency on the part of health administrations to require from travellers certificates of immunization, irrespective of the value of such immunizations for the protection of the countries reached by the travellers or for that of the travellers themselves.
>
> 'The committee was aware of the many disadvantages inherent in the compulsory production of immunization certificates, and considered that the serious obstruction to free and rapid travel caused by such requirement was out of all proportion to the protection likely to be afforded to the country of arrival.'

"5. *The Personal Declaration of Health.*—This document was compulsory for air travellers in the 1944 Sanitary Convention for Aerial Navigation, but its use under the WHO Regulations will be optional at the discretion of individual Governments."

In future the statutory immunizations, apart from those required for personal protection (*e.g.*, TAB), will be for smallpox and yellow fever only, with cholera immunization as an occasional measure.

The author mentions, and deprecates, the excessive quarantine precautions taken in some of the countries of the Near East during the cholera epidemic of 1947.

[For previous communications in this series see this *Bulletin*, 1948, v. 45, 213; 1949, v. 46, 413.] *Charles Wilcocks*

WORLD HEALTH ORGANIZATION. **Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death. Sixth Revision of the International Lists of Diseases and Causes of Death Adopted 1948. Vol. 1.** *Bull. World Health Organization.* Geneva. 1948. Suppl. 1. pp. xxxvii+376. [Review appears also in *Bulletin of Hygiene.*]

The old *International List of Causes of Death* amply proved its worth and did a great deal to bring order and clarity to national and international reporting. From time to time, of course, it has been necessary to revise the list, and the World Health Organization has now issued volume 1 of the sixth revision (adopted 1948). Volume 2 will comprise the index, and has not yet been received.

The introduction contains a historical review of classification of disease, and a statement of the methods adopted by the committee appointed to make the sixth revision. There is a detailed list of 612 categories of disease, 153 categories of external causes of injury, and 189 categories for characterization of injuries. This occupies pages 4 to 42, and comprises a three-digit classification. It is followed by a much more comprehensive four-digit list based on the same figures, but extended. This continues to page 321, and is followed by supplementary classifications, by instructions for medical certification and notes

on the rules for classification, by special tabulation lists (including lists of 150 and 50 titles), a suggested form of multiple-cause tabulation, and by the Regulations on Nomenclature adopted by the World Health Assembly.

In the introduction the purpose of a statistical classification is defined, it is " to provide a list of disabilities for compiling statistics and not a nomenclature of diseases and injuries. In other words, not every condition receives a particular rubric or number, but there is a category to which every condition can be referred."

The *Manual* has evidently been prepared with great care, and in an accompanying notice issued from Somerset House there is a short indication of the procedure by which the sections were submitted to practical tests on both sides of the Atlantic, and to the detailed scrutiny of various committees.

Some of the sections in the list of infective and parasitic diseases, however, should perhaps be amended when a new edition is produced. For instance, the old division of leprosy into lepromatous leprosy, neuroleprosy and mixed, has now been superseded, by international agreement, and the terms lepromatous, tuberculoid and undifferentiated have been adopted. The difference is more than a change of names. Under the heading schistosomiasis the subdivisions vesical (*S. haematobium*), intestinal (*S. mansoni*) and pulmonary (*S. japonicum*) should be discarded in view of the fact that the symptoms of *S. japonicum* infection are largely intestinal, and that the rare pulmonary manifestations can also be caused by *S. mansoni*. The filarial diseases are not differentiated except that onchocerciasis is mentioned separately, and infections with such diverse filarial worms as *Wuchereria bancrofti*, *W. malayi*, *Loa loa* and *Acanthocheilonema perstans* must all be placed together under filariasis. There are other minor points in this section which could be modified with advantage. *Charles Wilcocks*

WASHINGTON. **Proceedings of the Fourth International Congresses on Tropical Medicine and Malaria, Washington, D.C., May 10–18, 1948.** Vol. I. pp. xiii+1–946. Vol. II. pp. viii+947–1810, numerous figs. & pls. 1948. Washington : U.S. Govt. Printing Office.

The Abstracts of these Congresses, of which the present two volumes represent the detailed Proceedings, have already been reviewed at length [this *Bulletin*, 1948, v. 45, 1126].

The appearance of the full records of the Congresses indicate even more strikingly the immense range of the programme and of the papers that went to make it up and this additional review is intended to provide readers with further details of the subjects discussed and the nature of the meetings as a whole.

The Proceedings are reproduced in two handsomely bound and printed volumes, each covering some 900 pages. The first 100 pages deal with such general matters as the business of the opening plenary session ; the reports and resolutions eventually arrived at ; the presentation of the Laveran prize to Professor H. E. SHORTT and of the Walter Reed Medal to Professor N. H. SWELLENGREBEL ; a number of addresses and speeches, including the address of welcome by the Honourable George C. MARSHALL, Secretary of State, and the brilliant and penetrating after-dinner address by Dr. L. W. HACKETT. This part of the Proceedings also contains a full account of the Commemoration of the Demonstration by Walter Reed of the Mosquito Transmission of Yellow Fever and the Commemoration of the Fiftieth Anniversary of the Discovery by Ronald Ross of the Method of Transmission of Malaria. Finally, the introductory chapters give a list of officers, committees, rules of procedure and the general programme.

There then follow the reports of papers in the 12 sections, which make up the bulk of the two volumes. The Proceedings close with the minutes of three special conferences held during the Congresses at the suggestion of representatives of the World Health Organization to discuss respectively problems of malaria, plague and schistosomiasis : with an account of scientific and technical exhibits and institutions visited : and with a complete list of participants in the Congresses. At the end of the second volume there is a complete index of authors of the various papers.

Some idea of the nature of the subjects discussed may be obtained from the following list of sections, with notes of some of the principal subjects dealt with in each. It would be impossible, in a short space, to list each paper or its author : but each subject was dealt with by one or more well-known experts whose names will be familiar to readers of this *Bulletin* in association with the subjects concerned.

Research and Teaching Institutes.—Papers in this section referred separately to facilities in Africa, the Far East, Australia, the Americas and Europe.

Tropical Climatology and Physiology included physiological adaptation of dwellers in the tropics, deterioration and nutrition, climatology and human settlement in the tropics.

Bacterial and Spirochaetal Diseases dealt with *tuberculosis* (including BCG, X-ray diagnosis and streptomycin treatment) ; *syphilis, yaws, pinta* and *relapsing fever* (including penicillin treatment) ; *plague* (epidemiology, ecology, vaccination, antibiotics) ; *enteric diseases, cholera* and *electron microscopy* (the last named illustrated with some striking photomicrographs) ; *leptospirosis* ; *tropical environment as an influence on infectious disease* ; and *leprosy* (with particular reference to new developments in therapy).

Virus and Rickettsial Diseases included papers on viruses in general, rickettsial diseases in particular areas, their treatment with chloromycetin and the use of vaccines. Other sub-sections contained papers on *infectious hepatitis*, its aetiology and epidemiology ; epidemiology and control of *yellow fever, dengue*, and *sandfly fever* ; *poliomyelitis* in the tropics ; the *arthropod-borne encephalitides* and *rabies*.

Malaria constituted a long section of some 350 pages, made up of five sub-sections and nearly 40 separate papers. It covered all aspects of a wide subject, giving up-to-date information on parasite-host relationship, entomology, chemotherapy with the newer drugs, immunity, control and global epidemiology.

Helminthic Diseases was concerned particularly with the physiology of helminths and their relationship to their hosts and the epidemiology and pathology of helminthic diseases : *filariasis* and *schistosomiasis* were especially dealt with and new methods of chemotherapy and control discussed.

Protozoan Diseases contained a whole sub-section on the epidemiology, physiology, pathology and chemotherapy of *amoebiasis*, and included much information on experimental work. The second sub-section dealt principally with *leishmaniasis* and *trypanosomiasis*, both African and South American.

Nutritional Diseases in the Tropics formed an important section, occupying some 80 pages. It covered nutritional problems and specific deficiency diseases in several tropical areas.

Tropical Dermatology and Mycology discussed work on tropical mycology and included papers on present knowledge of *histoplasmosis, coccidioidomycosis* and *South American blastomycosis*. It also dealt with a number of tropical dermatoses.

Tropical Veterinary Medicine covered a wide range of animal diseases, protozoan, viral, helminthic and bacterial met with in the tropics.

Public Health consisted of four sub-sections dealing respectively with *education and research, health and medical services in the tropics*, the *tuberculosis problem*

in the tropics and *public health and vital statistics* problems. This section contained a large amount of information on services and organization in being and proposed.

Medical and Veterinary Entomology represented a section of some 170 pages, with four sub-sections. The first dealt with *mosquitoes and disease*, the second with *flies*, the third with *ticks, mites, lice and fleas* and the fourth with *triatomata, insecticides, toxicology* and *equipment*. This important section covered various regional aspects of entomological control and epidemiology and a great deal of information on the nature, toxicology and use of insecticides.

The volumes contain a number of excellent photographs and other illustrations.

These notes give a very brief account of a monumental piece of work. The wide range of subjects covered, the vast amount of up-to-date information contained and the distinction of those contributing to the Congresses are not only evidence of the success of the Congresses themselves: their record in two large volumes has resulted in what is in fact a large compendium on recent advances in tropical medicine and hygiene, to which all workers in tropical diseases can turn for reference with advantage and profit.

H. J. O'D. Burke-Gaffney

AFRIQUE OCCIDENTALE FRANÇAISE. Rapport sur le fonctionnement technique de l'Institut Pasteur de l'Afrique Occidentale Française en 1947 [DURIEUX, C.]. [**Technical Report of the Pasteur Institute in French West Africa in 1947.**] 128 pp. 1949. Dakar: Grande Imprimerie Africaine.

This Report is on the lines of its predecessors [this *Bulletin*, 1949, v. 46, 416]. The following points of special interest are noted.

The total number of specimens examined increased to 37,354 of which 18,162 were bacteriological, cytological and parasitological, 14,943 were serological, 3,782 chemical and 425 histopathological [the last-named are incorrectly shown as 14,943, the figure for serological examinations]. The Institute issued 19,368 ampoules of 6 cc. each of rabies vaccine during the year. The e were 49 anti-rabic treatments at the Institute and 473 at the other centres, with no deaths or paralytic accidents. It is added, however, that six deaths from rabies were reported which occurred in 1946—one each from French Sudan, Dahomey and Senegal and three from Togoland. Detailed statistics are given of the anti-rabies service and brief accounts of the cases referred to above.

A lengthy report is given of a transient paralytic condition which occurred in a European, and which lasted about a fortnight, after inoculation with a vaccine from Yaba, Nigeria. Bacteriological tests and animal inoculations from this vaccine failed to show any evidence of any neurotropic virus or other pathogen.

Vaccines and other biological products prepared at the Institute in 1947 amounted to over eight million doses or cc.

Vaccination against yellow fever was carried out in 3,109,638 cases. Yellow fever occurred only in Sudan—there was a small focus at Bamako which accounted for three European deaths. Prompt measures rapidly eliminated this focus.

Mention is made of a follow-up investigation carried out at the Swiss Tropical Institute at Basle on 476 persons who had received the Dakar Institute yellow fever vaccine. A short-lived reaction with mild pyrexia was found in 120 (25·2 per cent.), a more severe reaction in 32 (6·7 per cent.) and no appreciable reaction in 324. Later tests in Dakar showed that these persons had developed a solid immunity. Serum protection tests were carried out on 260 human and 47 animal sera. In two cases the tests were made for diagnostic purposes: both patients showed, clinically, features suggestive of yellow fever, although

both had received yellow fever vaccine, and both died. One patient (a European) who had been vaccinated previously at Marseilles gave a negative test, but yellow fever virus was isolated and at autopsy typical liver lesions were present. The other (an African) gave a strongly positive protection test on the third day and autopsy showed that the condition was infectious hepatitis.

Lengthy details are given of protection tests carried out to control yellow fever vaccination. An epidemiological enquiry was made in two towns on the Coast of French Somaliland, where protection tests were carried out on 100 Africans: only two were positive, both in Africans, one of whom had been certainly and the other probably vaccinated against yellow fever.

Among the 47 animals tested (all but one being baboons, *Papio papio*) there were five positive serum protection tests, all in animals from Guinea.

Among the special investigations referred to in the report is a lengthy discussion on the therapeutic properties of conessine: this subject has been discussed at length in this *Bulletin* [see above].

There are also discussions on tick-borne relapsing fever in Senegal and the rat as a reservoir. Of 512 rodents and insectivora examined at Dakar 95 (18·55 per cent.) were infected with *S. duttoni*, especially *Cricetomys gambianus* and *R. rattus alexandrinus*: the local vector is *Ornithodorus erraticus*.

A number of records are given of vitamin A estimations in Africans in Dakar and of vitamin C in the fruit, Detar (*Detarium senegalense*), which contains about 2 per cent. of the vitamin: some of these have already been referred to in this *Bulletin*, 1949, v. 46, 964.

An interesting study is reported on the chemical composition and caloric value of termites, which are eaten extensively by certain African tribes. It is shown in tables that living termites contained 28·25 per cent. fat, 23·22 per cent. protein and a caloric value of 347 per 100 gm.: corresponding figures on cooked (fried) termites were 36·15, 45·62 and 508. Corresponding calories for beef and dried salted fish (quoted from TIHON) and ground-nuts (BALLAND) are given as 127, 203 and 598 calories.

The Report ends with an account of the experimental station at M'Bao and three pages of listed publications by members of the staff of the Institute.

H. J. O'D. Burke-Gaffney

BULL. INST. HYG. MAROC. 1947, v. 7, 125–32. Rapport sur l'activité de l'Institut d'Hygiène pendant l'année 1947. [**Annual Report of the Hygiene Institute, Morocco, for 1947.**]

In the Institute, 26,343 microbiological and other medical laboratory examinations were made in 1947. In addition to these, 458 histopathological and over 1,000 chemical examinations were undertaken.

Epidemiological services included a scheme for revaccination of the population against smallpox every four years, studies of measures to prevent the introduction of cholera into Morocco and investigations on schistosomiasis.

Six anti-malarial missions were in operation in the country during the year and were concerned with anopheline breeding places, control, mass treatment and general epidemiology.

It is recorded that species was determined in the case of 3,695 anopheline larvae and 716 adults. The predominant vector of malaria was *A. maculipennis* [presumably *labranchiae*] (39 per cent.). *A. turkhudi* accounted for 28 per cent., *A. claviger* 12 per cent. and *A. sergenti* 10 per cent. Other species were *A. multicolor*, *A. marteri* and *A. coustani*.

Parasites were found in 2,038 of 9,097 blood films (*P. falciparum*, 53 per cent., *P. vivax*, 34 per cent., *P. malariae*, 13 per cent.).

Studies so far show that *A. turkhudi* is widely spread, but its rôle as a vector is not clearly established: the same view is expressed regarding *A. sergenti*

[see also this *Bulletin*, 1949, v. 46, 317]. It is stated that *A. claviger* is a notable vector at high altitudes, but is stated to be without danger below an altitude of 1,000 metres, because its development ceases before the temperature allows sporocysts to develop. [See also this *Bulletin*, 1949, v. 46, 432].

A brief note is given on air-spraying with larvicides and on the treatment of malaria with the newer synthetic products. It is noted that doses of proguanil [paludrine] between 0·3 to 1 gm. daily resulted in disappearance of *P. malariae* from the peripheral blood only in 6·5 to 11·5 days (average 9), in 12 cases: while in 28 cases of *P. falciparum* and 20 of *P. vivax* infections, the same dose produced disappearance of the parasites in 2·4 and 3·9 days respectively.

Biochemical studies included investigations on cholinesterase and the refractive index of serum. It is stated that both are lowered almost constantly in malaria and that quinine, quinacrine [mepacrine], nivaquine, and paludrine [proguanil] all have a definite anti-cholinesterase activity [but no details are given].

The anti-tuberculosis service was interrupted for several months, but tuberculin tests and radiographic examinations were made on 12,583 persons in urban areas (Fez) and rural areas (Merchouch and Skoura du Guigou). A summary of the results is shown in a short table.

H. J. O'D. Burke-Gaffney

BULL. INST. HYG. MAROC. 1947, v. 7, 133–94. Rapport sur l'activité des Services de la Direction de la Santé Publique et de la Famille pendant l'année 1947. [**Report on the Activity of the Public Health and Social Welfare Services during 1947.**]

Public health conditions in Morocco in 1947 were much more satisfactory than during the previous two years. The disasters of 1945, drought, famine malnutrition and an epidemic of relapsing fever, were still affecting health conditions in the early months of 1946. Relapsing fever was declining, however, and had practically disappeared in August 1946. In 1947 typhus fever had also a much lesser incidence; only 126 cases were reported. Deaths in 1947 numbered half those in 1946 and only a third of the 1945 figure.

Consultations in hospitals and dispensaries in 1947 numbered 9,654,876, wounds 38·5 per cent., fevers 42, and venereal diseases 19 per cent. Admissions to hospital numbered 89,000.

Vital statistics are available only for the 18 municipal towns. Data for Europeans are exact, for the Jewish population approximately correct, for the Musulman population unreliable: the Musulman population of these towns is largely a floating one. The death rates per 1,000 in 1947 were: Europeans 8·5, Jews 15, Musulmans 15, as compared with 10, 19·8 and 36 in the very unhealthy year 1945. More than half of the Jewish deaths and a third of the Musulman deaths were those of children under two years of age.

Trachoma is very prevalent; new cases treated in 1947 numbered 87,232. Only 61 cases of smallpox were notified against 1,870 in 1946. Measles is an important cause of infant mortality. There were 68 cases of scarlet fever notified but none fatal. Diphtheria notifications numbered 334; the fatality rate was low. Seven cases of anterior poliomyelitis and 29 cases of cerebrospinal meningitis were notified. Tuberculosis is widespread. There were 183 new cases of leprosy of which 64 were in the Fes-Taza region. Typhoid-paratyphoid infections were less in evidence, 902 cases as compared with 1,579 in the previous year. These diseases are essentially urban, affecting chiefly the European and Jewish elements of the populations.

There were only 19 sporadic cases of relapsing fever, tick-borne. The 126 cases of exanthematic typhus were the lowest number ever recorded: the increasing use of DDT probably contributed to this decrease; 216,000 anti-typhus

vaccinations were performed. The last case of plague occurred in October 1945; 128,837 rats were captured. There was no cholera; the outbreak in Egypt necessitated special precautions.

The report gives details of new hospitals under construction including a tuberculosis sanatorium of 280 beds, in the hills, and a tuberculosis pavilion of 100 beds at a hospital at Casablanca. *Norman White*

Cook, C. E. **The Native in relation to the Public Health.** *Med. J. Australia.* 1949, Apr. 30, v. 1, No. 18, 569–71.

The author, than whom there is probably none more experienced in the problems of their relationship to Europeans and Western civilization, traces the changes in the life of the Australian aborigines in the less settled part of western and northern Australia, from their unclothed food-gathering nomadic existence when the continent was discovered to the present position, which is further complicated by an increasing half-caste population. In their natural condition the scarcity of food necessitated their constant wandering over wide areas in small groups. This effectively prevented the development of epidemic infections and at the same time excluded them from developing any empirical preventive medicine. European occupation in the areas concerned is still very sparse but has from the start always encouraged the settling of the aborigines round homesteads and township to reduce disturbance and killing of their stock and to have labour readily available. This new mode of life offered a virgin field for infections and epidemics, and is usually associated with unsanitary conditions and squalor.

In the inevitable and present close contact of aborigines, half-castes and Europeans, the author recognizes a grave health problem, particularly as regards leprosy, ankylostomiasis, amoebiasis, malaria and tuberculosis. "Clearly the adaptation of the native to community life and his successful integration into the white social structure are public health problems of the first importance." No government department is more vitally affected and more suitably equipped for attempting the solution of the problems arising from this failure to "orientate the native component into its [the nation's] general population" than that of public health.

The author then deals with the necessary measures. These include broad education of both sections of the population, adequate housing of aborigines and half-castes, and special but fundamental requirements for the northern areas. He admits that the cost would not be light and in the absence of popular demand its financing from State or Federal budgets would be difficult.

Should public health requirements not awaken popular action the author points out that uneducated, bewildered, without a place in the social structure, "the native hybrid must remain a ready prey to agitators and a receptive field for subversive ideologies." That this section is rapidly increasing in numbers and may soon dominate the population in substantial areas adds a further emphasis from the point of view of national defence of invasion from Asia. *C. J. Hackett*

BOOK REVIEWS

DÉVÉ, Félix. **L'échinococcose osseuse.** [Hydatid Disease of the Bones.] 236 pp., 30 figs. 1948. Paris: Masson et Cie, 120 Boulevard Saint-Germain. [700 *fr.*]

——. **L'échinococcose primitive. (Maladie hydatique.)** [Hydatid Disease.] 362 pp., 63 figs. 1949. Paris: Masson et Cie, 120 Boulevard Saint-Germain. [1,000 *fr.*]

The first of these two remarkable memoirs, both of which are in the French language, is devoted to osseous hydatid disease. It is edited by the doctors of Uruguay in homage to its author and is dedicated by the author to Professor Domingo Prat, of Montevideo, Professor Oscar Ivanissevich, of Buenos Aires, and to Daniel J. Cranwell. It is a treatise which can hardly be neglected by anyone interested in its subject. With characteristic modesty, Professor Dévé says that, if he has, throughout the work, given his own views, this is not because he wishes to impose them upon others, but because he wishes to call attention to problems as yet unsolved and to provoke discussion and criticism. Certainly no reader could accuse him of seeking to impose his own views unfairly, for, throughout the work, he quotes the work and views of others, giving abundant references to the literature, and his pages are full of reasons why he does not agree with some other writers. He believes, for instance, and gives his reasons for believing, that osseous hydatids are not different from alveolar hydatids, but take the forms, which he so well describes, because the parasite, when it enters the rigid "Procrustean bed" of bony tissue, suffers a structural alteration and a biological change, which determine its peculiar forms and can be compared, as LEUCKART compared it, to the racemose form sometimes assumed by *Cysticercus cellulosae*. Intermediary forms between osseous and alveolar hydatids do exist, in spite of the denial of their existence by POSSELT. Dévé concludes also that Virchow's original conception that multilocular hydatid of the liver is only a particular form of hydatid cyst can be maintained, but only in the sense that these two modes of structure and development are forms assumed by the same parasite. There is, that is to say, only one species of *Echinococcus*. Its alveolar form is a secondary derivation which becomes specific and definitive and its osseous forms are determined by the rigidity of the bony tissues around it. His reasons for this view are expressed throughout this memoir and can only be appreciated by careful study of the whole book.

It is, indeed, impossible to do justice to this memoir in a brief review. Its range and detail are too considerable for that. In the introduction the author points out that osseous hydatid disease constitutes only 1 per cent. of all cases of hydatid disease, so that it is rare. It is, however, clinically interesting because it is symptomatically silent for a long time so that the lesions caused by it extend considerably before they can be discovered; and it is pathologically interesting because of the indefinite progression of the lesions in the bone affected and their frequent propagation to neighbouring bones. It also often develops in positions which prevent its surgical removal.

Pointing out that the initial phase of the osseous hydatid has never been seen in man and cannot be studied in him because it never declares itself until it is in an advanced phase or complications have developed, Dévé describes in detail his experimental introduction of hydatid sand into rabbits and other animals and the osseous disease that resulted, comparing his results with those obtained by others. He concludes that bone is a relatively favourable medium for the development of hydatids and that bone has little power to resist their development, a view also held by GANGOLPHE. Bone tissue, says Dévé,

seems to confer on hydatids a particular vitality, a relatively malignant character. The pathogenic process includes (*a*) A mechanical process, namely a series of disorders caused by the simple expansion in the bone of the hydatid cyst full of fluid under tension, and the erosion of bone by pressure upon it, and its atrophy. The cyst moulds itself to the bone irregularities, ramifying and taking an irregular form, partly owing to the formation of irregular diverticula from the original cyst, formed because the resistant bone prevents the normal expansion of a spheroidal cyst. These diverticula may be bifurcated or angular and coalescence of the internal germinal layer lining them may cut off some diverticula from the original vesicle, so that independent cysts are formed. In addition to this there is exogenous proliferation, which also gives rise to new vesicles. These reproduce and propagate the pathogenic process, so that multilocular cysts arise. A series of independent vesicles thus arises in the bone cavities, which continue the process by more exogenous budding, so that a sort of colony of the cysts is formed.

(*b*) *Necrosis* of bone. Relatively unimportant forms of this are superficial toxic necrosis and the formation of small sequestra. The most important form of it in man is the massive necrosis due to ischaemia, which is seen in advanced stages of erosion.

(*c*) *Active erosion,* which is the chief process which destroys both spongy and compact bone. It is not accompanied by inflammation and no fibrous tissue is formed round the hydatid, provided that infection does not occur.

While the author's views on the development of the parasite and on the manner in which it produces its effects are particularly interesting and valuable, the rest of the book will be, for some readers, even more interesting. There is not space to consider here all that the author has to say on the aetiology, symptoms, diagnosis, complications, prognosis and treatment of this disease. For the author's summary and discussion of these aspects of osseous hydatid disease, the memoir itself must be consulted. It is likely that it will be consulted by many readers in the years to come, for here we have the essence of its author's lifetime of experience and everyone who has occasion to study hydatid disease in any form will be grateful for it.

The second memoir listed above is a worthy companion of the first. Somewhat longer, it amounts to a detailed discussion of the biology and effects of hydatid cysts, the treatment of them and the aetiology of hydatid disease, its geographical distribution and its prophylaxis. Some medical men will no doubt find this volume more useful than the one just reviewed.

The memoir is divided into two parts. Part I deals with the structure, biology and medical aspects of *Echinococcus,* Part II with its geographical distribution and with the aetiology and prophylaxis of hydatid disease. A useful detail of the first part is a list of the popular names given to hydatid disease in various countries. Then follow a description of the adult tapeworm and its effect on the dog, a list of its other hosts, and of the hosts of the hydatid phase and a valuable detailed description of the hydatid cyst itself and of its development and certain anomalous forms of it. The author records his opinion, already discussed above, that there is only one species of *Echinococcus* and proceeds to discuss the pathological anatomy and pathogenesis and certain general pathological relations of hydatid disease, such as its relation to cirrhosis of the liver, to lithiasis, tuberculosis and cancer and its medico-legal aspects. The symptoms and evolution of the disease caused and its complications are next considered and then the diagnosis, prognosis and treatment.

The section on aetiology, which opens Part II of the memoir, discusses the part played by dogs and cats, the cat being exonerated from all blame. The parts played by age, sex, family relations and trauma are discussed. To some readers the considerable sections on the geographical distribution of hydatid disease

and on its prophylaxis will be the most useful in the book for these are not dealt with in textbooks in the detail given here. No less valuable are the references to the literature. Certainly every parasitologist will find this memoir invaluable. If he has also the memoir briefly reviewed above and the same author's "*l'Echinococcose secondaire*" (Paris: Masson et Cie. et Paul Deval, 1946. 241 pp., 59 figures), he will have, recorded by a master, a detailed discussion of every aspect of this remarkable parasite and its effects. *G. Lapage*

KLEINE, Friedrich Karl. **Ein deutscher Tropenarzt.** [A German Tropical Doctor.] Einfuhrüng von Herbert KUNERT. 182 pp., 19 figs. 1949. Hanover: Schmorl & von Seefeld Nachf. [D.M.12.]

All who have had the honour and pleasure of working with Professor Kleine or of being otherwise associated with him in tropical Africa will welcome the appearance of this book, and it will also have a special interest for those whose duties bring them into contact with human and animal trypanosomiasis. It has been published as a tribute to this distinguished research worker in tropical medicine on the occasion of his reaching his 80th birthday.

Kleine's studies of tropical diseases of man and animals during nearly fifty years began when he accompanied Robert Koch in 1903 to Rhodesia to investigate what proved to be African Coast Fever in cattle. A few years later he again accompanied Koch as a member of the German Sleeping Sickness Expedition to German East Africa, and he afterwards devoted most of his life to the study of this disease. In 1909 he proved by simple experiments that trypanosomes develop in tsetse flies for a few weeks before the flies become infective [as Koch suspected in 1905 from his observations on the "proboscis drop"]; transmission by tsetse flies was therefore chiefly indirect and not merely mechanical as other workers had thought. Kleine's work on sleeping sickness was interrupted by the first World War in 1914, but in 1922 he went to Rhodesia and the Belgian Congo to test the new drug "Bayer 205" (Germanin) in human and animal trypanosomiasis; in 1926–7, as a member of the League of Nations Sleeping Sickness Commission, he carried out researches in Uganda, Kenya and Tanganyika Territory. He has since spent much of his time in East and South Africa.

The book consists mainly of reprints of interesting accounts which Kleine wrote from time to time of his various visits to Africa; this is preceded by a short preface and a biographical introduction by Professor Herbert Kunert. At the end of the book are a chronological index of Kleine's published papers and an index of names of people mentioned in the book. There are 19 photographic illustrations on 12 plates; they include portraits of Kleine, Koch and David Bruce, some East African scenes, and two poor photographs of *Glossina morsitans* and *G. palpalis* whose labels seem to have got transposed.

As in the case of Robert Koch, a biography of Kleine is largely a record of his research work, but personal qualities such as his perseverance in difficulties, his sense of humour and his unvarying courtesy, so well known to his friends and co-workers, are revealed in these accounts of his travels. The reviewer remembers his reply to doubts expressed whether a lorry could get through the swamps and floods to Ikoma, a 90-mile journey; it was "It is astonishing what a motorcar can do". During the last thirty years Kleine has been accompanied on his travels by his wife, whose cheerful endurance of primitive "bush" conditions, including rat-infested houses, was much admired, and whose many kindnesses to people who, like the reviewer, shared some of those conditions, are gratefully remembered. *J. F. Corson*

KIRK, J. Balfour [C.M.G., M.B., Ch.B., F.R.C.P., D.P.H., D.T.M. & H., etc.]. **A Manual of Practical Tropical Sanitation.** 2nd Edition. pp. vii+288, 46 figs. 1949. London: Baillière, Tindall & Cox, 7 & 8 Henrietta Street, W.C.2. [10/6].

The first edition [see this *Bulletin*, 1937, v. 34, 897] of this manual was a most useful book, designed for sanitary inspectors and for managers of plantations and mines, who should know the fundamental facts of the causes, transmission and prevention of disease in the tropics; there are not many books of this kind. This second edition can be recommended very confidently. It is largely a reprint of the first edition, with additions to bring it up to date, but as the general principles of the subject have not changed much since 1937, the older material retains its value. The author's style is clear and interesting, and the format is attractive, though the print is slightly smaller than in the original edition. However, it is still quite big enough to be read with comfort. The illustrations are the same as before (including the intriguing picture on p. 255 of the aqua privy, where the user must, it seems, perch himself (or herself) on the end of a 6-inch drain-pipe and hope for the best).

Many additions have been made, but they have been kept so brief that the book has not been greatly lengthened; and there are some deletions. For instance, DDT and benzene hexachloride are described, and their uses are detailed; a section has been added on poliomyelitis (but there is no reference to this in the index); ANTU is included (p. 125) among the rat poisons (but the proof reader has allowed *Rattus Norwegicus* to elude him); some of the new anti-malarial drugs (but not chloroquine) are mentioned, though the dosages suggested for suppression are smaller than those now accepted.

On the other hand, there are some important omissions. The spread of *Entamoeba histolytica* by water is not mentioned; there is no reference to jungle yellow fever; the process of premunition in malaria is not described, though immunity in other diseases is discussed; scrub typhus and murine typhus are not described. These, however, are small defects in a book which will be of the greatest value to sanitary inspectors. It contains chapters on elementary anatomy and physiology, the communicable diseases, entomology, disinfection, housing, food, milk, water, sewage, refuse, laundries, schools, and village sanitation. The author writes with the authority of his long tropical service as a health officer and as a Director of Medical Services.

Charles Wilcocks

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